

MTNC040313A1

B05

Service Manual

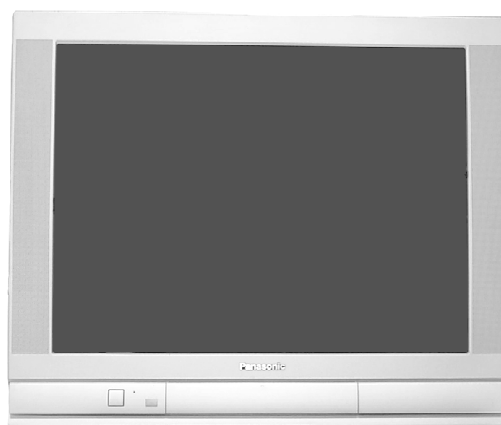
Color Television



CT-27SC14J / CT-27SC14UJ

GN3 (NA10)

This simplified service manual is issued to add listed models to the NA10 family service manual order No. MTNC030623C1(CT-25L8G). A complete parts list and schematics are included in this simplified service manual. Please file and use this simplified service manual together with main service manual order No. MTNC030623C1 (CT-25L8G).



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WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

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IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by  in the Schematic Diagrams, Circuit Board Diagrams, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

1. Safety precautions

General guidelines

An isolation transformer should always be used during the servicing of a receiver whose chassis is not isolated from AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks. It will also protect the receiver from being damaged by accidental shorting that may occur during servicing.

When servicing, observe the original lead dress, especially in the high voltage circuit. Replace all damaged parts (also parts that show signs of overheating.)

Always replace protective devices, such as fuse, isolation resistors and capacitors, and shields after servicing the receiver. Use only manufacturer's recommended rating for fuses, circuit breakers, etc.

High potentials are present when this receiver is operating. Operation of the receiver without the rear cover introduces danger for electrical shock. Servicing should not be performed by anyone who is not thoroughly familiar with the necessary precautions when servicing high voltage equipment.

Extreme care should be practiced when handling the picture tube. Rough handling may cause it to implode due to atmospheric pressure. (14.7 lbs per sq. in.). Do not nick or scratch the glass or subject it to any undue pressure. When handling, use safety goggles and heavy gloves for protection. Discharge the picture tube by shorting the anode to chassis ground (not to the cabinet or to other mounting hardware). When discharging connect cold ground (i.e. tag ground lead) to the anode with a well insulated wire or use a grounding probe. Avoid prolonged exposure at close range to unshielded areas of the picture tube to prevent exposure to x ray radiation.

The test picture tube used for servicing the chassis at the bench should incorporate safety glass and magnetic shielding. The safety glass provides shielding for the tube viewing area against x ray radiation as well as implosion. The magnetic shield limits the x ray radiation around the bell of the picture tube in addition to the restricting magnetic effects. When using a picture tube test jig for service, ensure that the jig is capable of handling 50kV without causing x-ray radiation.

Before returning a serviced receiver to the owner, the service technician must thoroughly test the unit to ensure that it is completely safe to operate. Do not use a line isolation transformer when testing.

Leakage current cold check

Unplug the A.C. cord and connect a jumper between the two plug prongs. Measure the resistance between the jumpered AC plug and expose metallic parts such as screwheads, antenna terminals, control shafts, etc. If the exposed metallic part has a return path to the chassis, the reading should be between $240\text{k}\Omega$ and $5.2\text{M}\Omega$. If the exposed metallic part does not have a return path to the chassis, the reading should be infinite.

Leakage current hot check

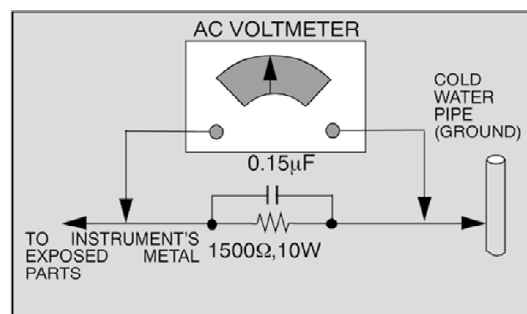
Plug the AC cord directly into the AC outlet. Do not use an isolation transformer during the check.

Connect a $1.5\text{k}\Omega$ 10 watt resistor in parallel with a $0.15\text{ }\mu\text{F}$ capacitor between an exposed metallic part and ground. Use earth ground, for example a water pipe.

Using a DVM with a 1000 ohms/volt sensitivity or higher, measure the AC potential across the resistor.

Repeat the procedure and measure the voltage present with all other exposed metallic parts. Verify that any potential does not exceed 0.75 volt RMS. A leakage current tester (such a Simpson model 229, Sencore model PR57 or equivalent) may be used in the above procedure, in which case any current measure must not exceed 0.5 milliamp. If any measurement is out of the specified limits, there is a possibility of a shock hazard and the receiver must be repaired and rechecked before it is returned to the customer.

Hot check circuit



Insulation test

Connect an insulation tester between an exposed metallic part and A.C. line. Apply 1080VAC/ 60Hz for 1 second. Confirm that the current measurement is $0.5\text{mA} \sim 2.0\text{mA}$. Repeat test with other metallic exposed parts.

X-ray radiation

WARNING

The potential source of x-ray radiation in the TV set is in the high voltage section and the picture tube.

NOTE

It is important to use an accurate, calibrated high voltage meter.

Set the brightness, picture, sharpness and color controls to minimum.

Measure the high voltage. The high voltage should be $29.25 \pm 1.25\text{kV}$. If the upper limit is out of tolerance, immediate service and correction is required to insure safe operation and to prevent the possibility of premature component failure.

Horizontal oscillator disable circuit test

This test must be performed as a final check before the receiver is returned to the customer. See horizontal oscillator disable circuit procedure check in this manual.

2. Service notes

NOTE

These components are affixed with glue. Be careful not to break or damage any foil under the component or at the pins of the ICs when removing. Usually applying heat to the component for a short time while twisting with tweezers will break the component loose.

Leadless chip component (surface mount)

Chip components must be replaced with identical chips due to critical foil track spacing. There are no holes in the board to mount standard transistors or DIODOs. Some chips capacitor or resistor board solder pads may have holes through the board, however the hole diameter limits standard resistor replacement to 1/8 watt. Standard capacitor may also be limited for the same reason. It is recommended that identical components be used.

Chip resistor have a three digit numerical resistance code, 1st and 2nd significant digits and a multiplier. Example: 162 = 1600 or 1.6k Ω resistor, 0 = 0 Ω (jumper).

Chip capacitors generally do not have the value indicated on the capacitor. The color of the component indicates the general range of the capacitance.

Chip transistors are identified by a two letter code. The first letter indicates the type and the second letter, the grade of transistor.

Chip DIODOs have a two letter identification code as per the code chart and are a dual DIODO pack with either common anode or common cathode. Check the parts list for correct DIODO number.

Component removal

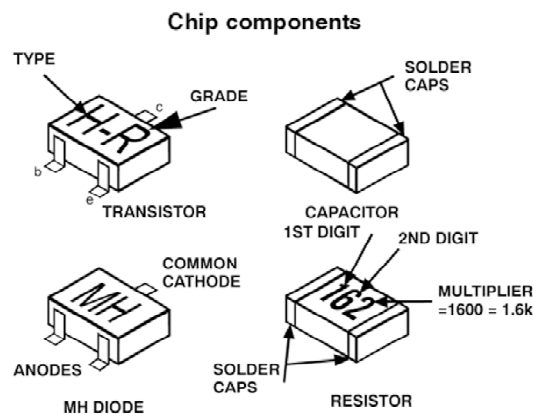
- 1. Use solder wick to remove solder from component end caps or terminal.**
- 2. Without pulling up, carefully twist the component with tweezers to**

break the adhesive.

3. Do not reuse removed leadless or chip components since they are subject to stress fracture during removal.

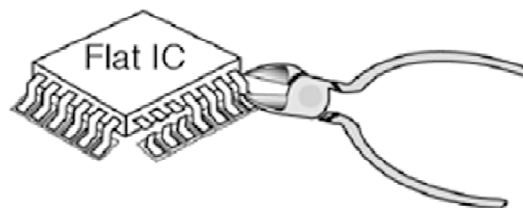
Chip component installation

1. Put a small amount of solder on the board soldering pads.
2. Hold the chip component against the soldering pads with tweezers or with a miniature alligator clip and apply heat to the pad area with a 30 watt iron until solder flows. Do not apply heat for more than 3 seconds.

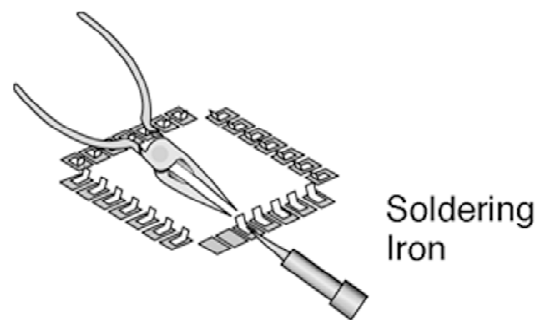


How to replace flat IC (required tools)

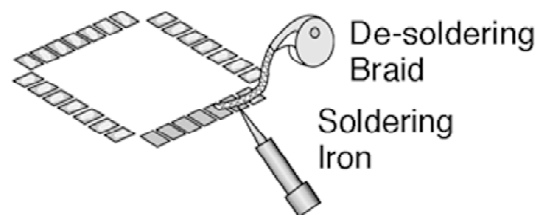
1. Remove the solder from all of the pins of a Flat IC by using a desolder braid



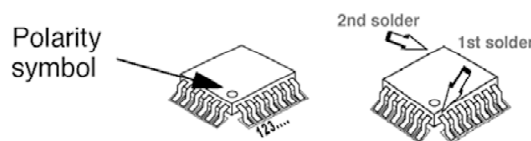
2. Put the iron wire under the pins of the Flat IC and pull it in the direction indicated while heating the pins using a soldering iron. A small awl can be used instead of the iron wire.



- 3. Remove the solder from all the pads of the Flat IC by using a de solder braid**



- 4. Position the new Flat IC in place (apply the pins of the Flat IC to the soldering pads where the pins need to be soldered). Properly determine the positions of the soldering pads and pins by correctly aligning the polarity symbol**



- 5. Solder all pins to the soldering pads using a fine tipped soldering iron**



- 6. Check with a magnifier for solder bridge between the pins or for dry joint between pins and soldering pads. To remove a solder bridge, use a de solder braid as shown in the figure below**



IMPORTANT

To protect against possible damage to the solid state devices due to arcing or static discharge, make certain that all ground wires and CRT DAG wire are securely connected.

CAUTION

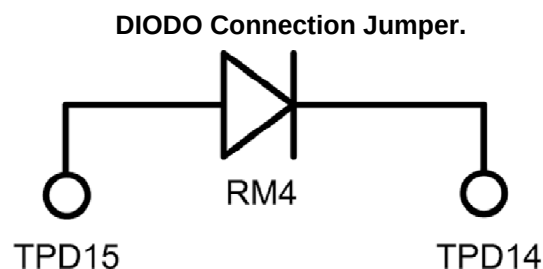
The power supply circuit is above earth ground and the chassis cannot be polarized. Use an isolation transformer when servicing the receiver to avoid damage to the test equipment or to the chassis. Connect the test equipment to the proper ground(hot) or (cold) when servicing, or incorrect voltages will be measured.

2.1. X-Ray Protection Circuit Check & Adjustments

This test must be performed as final check before the receiver is returned to the customer. If voltages are out of tolerance, immediate service and correction is required to insure safe operation and to prevent the possibility of premature component failure.

Equipment:

1. Isolation transformer.
2. High voltage meter.
3. D.C. Ammeter
4. Short jumper.
5. HHS jig (See figure below).



Preparation:

1. Make sure the receiver is turned off.
2. Connect the receiver to an isolation transformer.
3. Connect the ammeter serial from the flyback anode lead to the picture tube anode socket.

4. Prepare short jumper and HHS jig.

Procedure:

- 1. Connect the short jumper between TPD16 & TPD17.**
- 2. Connect the jumper DIODO between TPD14 and TPD15 (anode connected to TPD15 and cathode to TPD14).**
- 3. Apply 75VAC to AC input of isolation transformer.**
- 4. Turn the receiver on.**
- 5. Apply a monoscope pattern.**
- 6. Set customer picture and brightness controls to the minimum.**
- 7. Set current within 50 μ A to 100 μ A by changing the picture and bright controls.**
- 8. Slowly increase AC voltage at the input of the isolation transformer and confirm HHS voltage measure 34.5kV.**
- 9. Turn power off and remove jigs.**

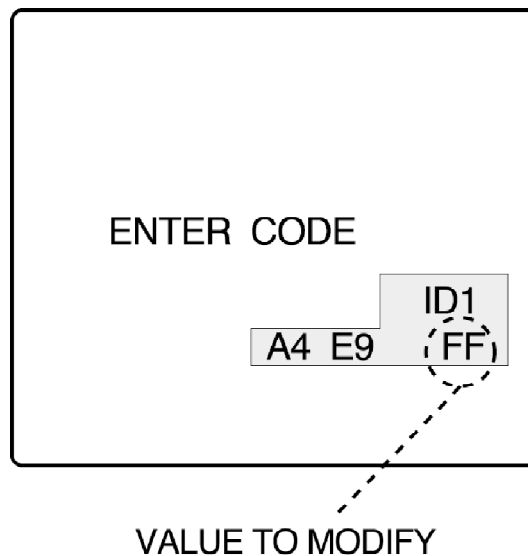
3. EEPROM replacement

If a new EEPROM integrated circuit is replaced for servicing, follow the next procedure once that the memory is properly assembled:

- 1. Enter to service mode.**
- 2. Turn the TV set ON.**
- 3. Once inside service mode the first image that appears on-screen is the ID1 register with the respective address value (FF) like the image below.**

Note:

All 3 registers (ID1,ID2,ID3) should appear with FF values if a new EEPROM is assembled.



4. With “VOL” keys adjust the correct value according with the service adjustment table (see “Service Mode” section).
5. Change to the next ID switch register with “CH” keys and repeat the same procedure as step 4.
6. When replacing a new EEPROM be sure to set the correct ID switch values for each model.
7. Once that all 3 registers are set with the correct address value, perform all of the remaining adjustments and servicing.

IMPORTANT:

Correct ID switch configuration should be input when replacing EEPROM for each television model, otherwise if wrong values are configured, the television software will not function accordingly and properly.

4. About lead free solder (PbF)

NOTE

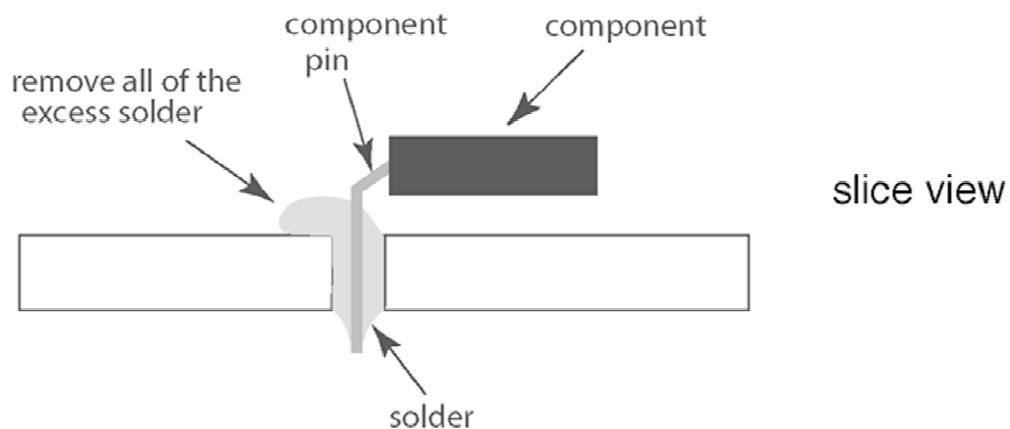
Lead is listed as (Pb) in the periodic table of elements. / In the information below, Pb will refer to lead solder, and PbF will refer to Lead Free Solder. / The lead free solder used in our manufacturing process and discussed below is (Sn+Ag+Cu). / That is Tin (Sn), Silver (Ag) and Copper (Cu) although other types are available.

This model uses Pb Free solder in its manufacture due to environmental conservation issues. For / service and repair work, we'd suggest the use of Pb free solder as well, although Pb solder may be / used. / PCBs manufactured using lead free solder will have the “PbF” or a leaf symbol stamped on the / back of PCB.



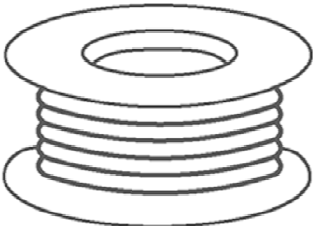
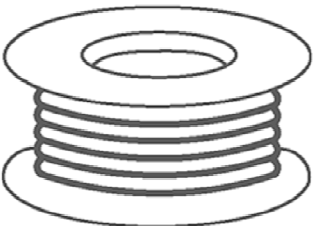
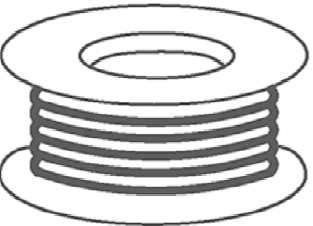
CAUTION

- **Pb free solder has a higher melting point than standard solder.**
Typically the melting point is 50 ~ 70 °F (30 ~ 40 °C) higher. Please use a high temperature soldering iron and set it to 700 ± 20 °F (370 ± 10 °C).
- **Pb free solder will tend to splash when heated too high (about 1100 °F or 600 °C).** / If you must use Pb solder, please completely remove all of the Pb free solder on the pins or solder area before applying Pb solder. If this is not practical, be sure to heat the Pb free solder until it melts, before applying Pb solder.
- **After applying PbF solder to double layered boards, please check the component side for excess solder which may flow onto the opposite side.**



Suggested Pb free solder

There are several kinds of Pb free solder available for purchase. This product uses Sn+Ag+Cu (tin, silver, copper) solder. However, Sn+Cu (tin, copper), Sn+Zn+Bi (tin, zinc, bismuth) solder can also be used.

0.3mm X 100g	0.6mm X 100g	1.0mm X 100g
		

5. Receiver feature table

FEATURE/MODEL	CT-27SC14J/UJ
CHASSIS	GP423
MICRO	128K
MENU LANGUAGE	ENG/SPAN/FR
CLOSED CAPTION	X
V-CHIP (USA/CANADA)	X
CHANNEL COUNT	181
CHANNEL INFO BANNER	X
VIDEO INPUT SKIP	SKIP
75 OHM INPUT	X
REMOTE CONTROL	EUR7613ZB0
CRT SUPPLIER	SAMSUNG FLAT
FAMILY	GN3
COMB FILTER	3 DIG
HEC/VEC (X=BOTH)	X
VM	X (SELECTABLE)
V/A NORM (X=BOTH)	X
COLOR TEMP	X
PRESET/INPUT LABELING	X
VIDEO PICTURE MEMORY	X
MTS/SAP/DBX	X
BUILT-IN AUDIO POWER	5Wx2
No. OF SPEAKERS	2
BASS/BAL/TREBLE CONTROL	X
AI SOUND	X
SURROUND	X
A/V IN (REAR/FRONT)	3(2/1)
AUDIO OUT (FAO: F, VAO: V)	F, V
COMPONENT INPUT (Y, Pb, Pr)	1
S-VIDEO INPUT (REAR/FRONT)	1/0
DIMENSIONS(WxDxH)	687x496x568mm27.04x19.52x22.36
WEIGHT (Kg/Lbs)	41.5/ 91.49

Note:

Specifications are subject to change without notice or obligation. Dimensions and weights are approximate.

6. Board description table

CT-27SC14J / CT-27SC14UJ

BOARD	PART NUMBER	DESCRIPTION
A	TNP2AH060MC	MAIN BOARD
C	TNP2AA157AP	CRT BOARD
G	TNP2AA188	FRONT PANEL

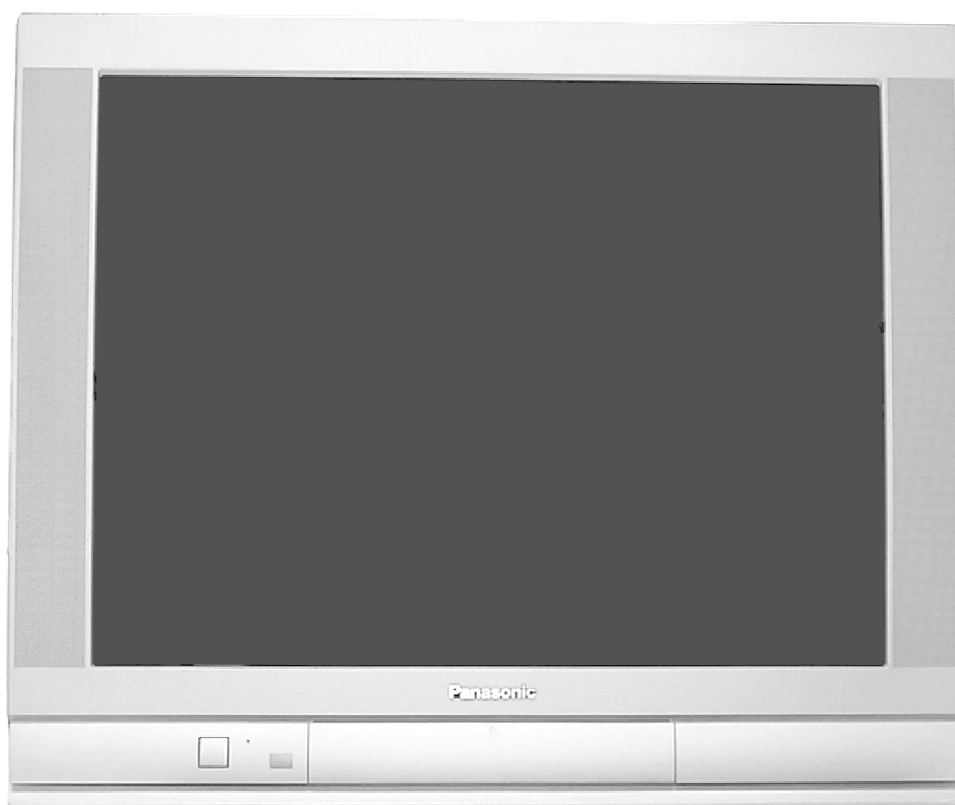
NOTE

When ordering a replacement board assembly, append an “S” to the board number

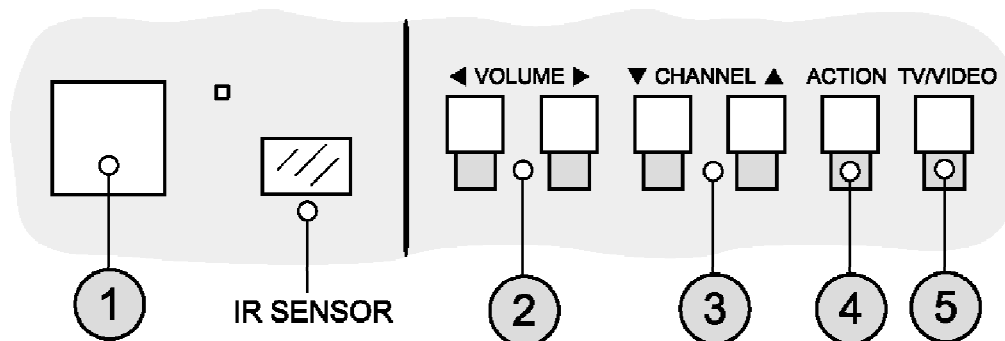
EXAMPLE

To order the A Board, for CT-27SC14J the replacement board is TNP2AH060MCS.

7. TV Location of controls



***Note: controls inside front door.**



Quick reference control operation	
1	Power - Press to turn ON or OFF.
2	Volume - Press to adjust sound level, or to adjust audio menus, video menus, and select operating features when menus are displayed
3	Channel - Press to select programmed channels. Press to highlight desired features when menus are displayed. Also use to select cable converter box channels after programming remote control infra-red codes (the TV/AUX/CABLE switch must be set in CABLE position).
4	Action - Press to display main menu and access on screen feature and adjustment menus.
5	TV/Video - Press to select TV or one of the video inputs.

8. Location of controls (remote)

8.1. EUR7613ZB0

POWER
Press to turn ON and OFF.

TV - VCR - DBS/CBL - DVD
Press to select a component

MUTE
Press to mute sound.

TV/VIDEO
Press to select TV, Video mode.

MENU
Press to select TV, Video mode.

KEYBOARD
Press to select any channel.

R-TUNE
Press to switch to previously viewed channel or video mode.



SAP
Press to access the secondary audio program broadcast.

CH
Press to select next or previous channel and navigate in menus.

VOL
Press to adjust TV sound and navigate in menus.

RECALL
Press to display time, channel sleep timer and other options.

GUIDE
DBS and DVD functions button.

EXIT
DBS menu function button.

PROG
Press for delimiter between major and minor channel number.

DVD & VCR KEYPAD
Press to control DVD and VCR basic functions.

Note:

For additional information about this remote please refer to the owner's manual section remote operation, listed on the parts list section.

9. Dissassembly for service

Back cover

Remove all the screws marked with an arrow (←) from the back of the receiver

NOTE

Use same hardware when reassembling the receiver.

- 3 screws at the top edge of the receiver.
- 1 screw at each lower corner of the receiver.
- 3 screw in the lower back.
- 3 screws in the A/V cover.

A-Board - Main chassis

1. Slide the chassis completely out of the guide rails.
2. Disconnect cable connectors (if necessary).
3. Remove the screws from the board fastener.
4. Stand the receiver on its edge. The underside of the board is completely accessible for component replacement.

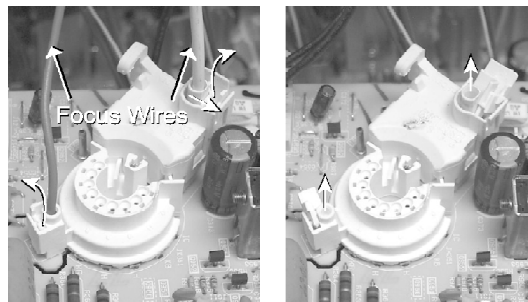
Note:

Some tie-wraps that secure the wire dressings may need to be unfastened for chassis removal.

C-Board - CRT output

The board plugs onto the socket on the CRT neck. To release the Focus wire, use a dull object to release the tab on the socket (near the wire opening) and carefully pull on the wire. To connect the focus wire, press on the tab to lock it then insert the wire in the opening and press on it until it is fully inserted and locked in place.

Focus cable release



Speakers

Each speaker is secured to the cabinet with 4 screws.

NOTE

When reassembling speakers be sure to connect the speaker wires to the correct speaker lead (+) (-)

9.1. Disassembly for CRT replacement

1. Discharge the CRT as instructed in the “safety precautions”.
2. Disconnect the yoke (DY) plug, degaussing coil (DEG) plug from

the main board.

3. Unplug the CRT 2nd anode button from the main board.
4. Remove the C-Board from the CRT base and unplug the black wires (CRT dag ground) C11 & C21.
5. Disconnect the speakers plug from the A-Board.
6. Lift the main chassis (A-Board) and all mounted boards completely out with the CRT board attached.
7. Perform complete removal of chassis, as instructed in “disassembly for service” section.

CRT replacement

1. Perform “disassembly for CRT replacement” procedure.
2. Insure that the CRT H.V. Anode button is discharged before handling the CRT. Read the “safety precautions” section on handling the picture tube.
3. Remove the components from the CRT neck and place the cabinet face down on a soft pad.
4. Note the original order for the CRT mounting hardware as they are remove from the CRT mounting brackets at each corner of the CRT.
5. Remove the CRT with the degaussing coil and the dag ground braid attached.
6. Note the original locations and mounting of the degaussing coil and the dag ground assembly to insure proper reinstallation on the replacement CRT.

To remove and remount the degaussing coil:

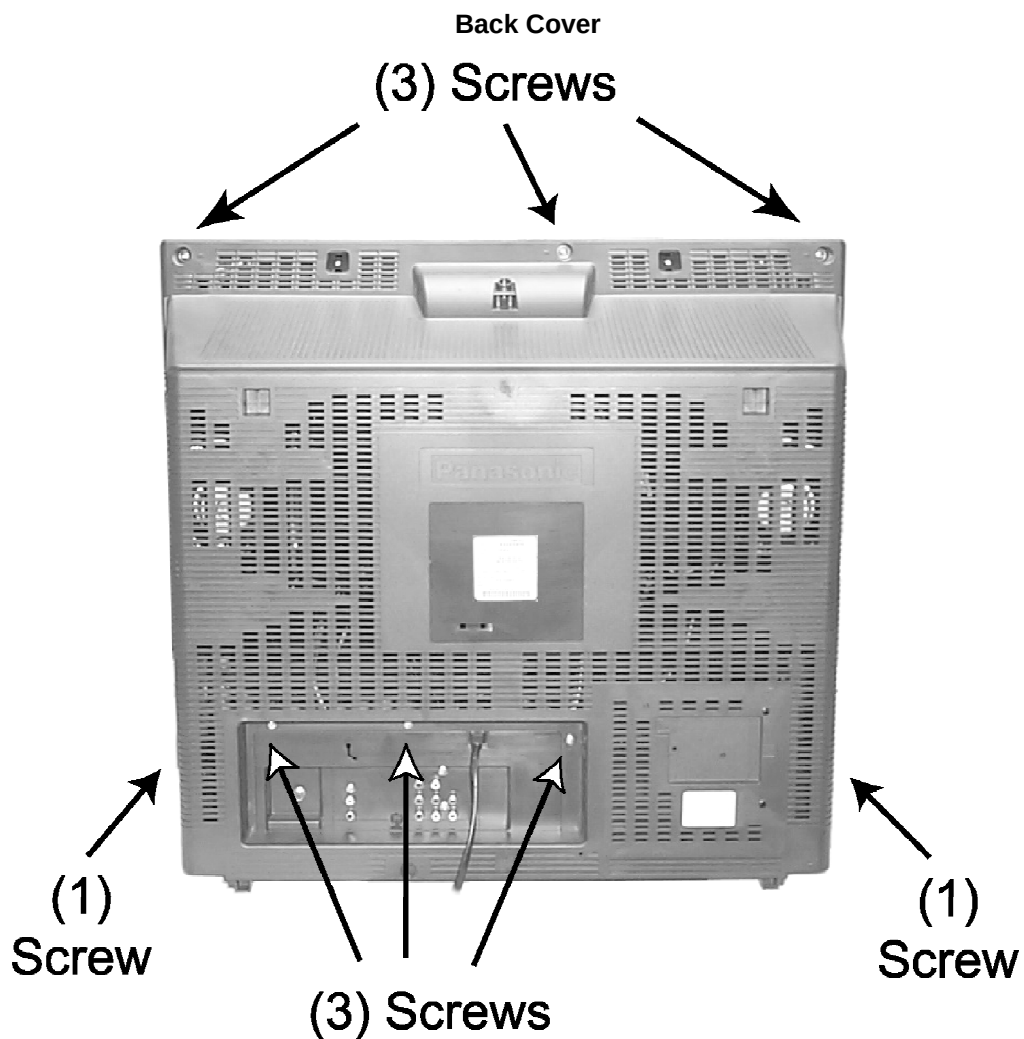
- Unhook the coil spring from the bottom corners of the CRT ears.
 - Release the braid loop from the upper corners of the CRT ears.
7. Mount the dag ground braid on the replacement CRT. Position the degaussing coil with new ties.
Dress coil as was on the original CRT.

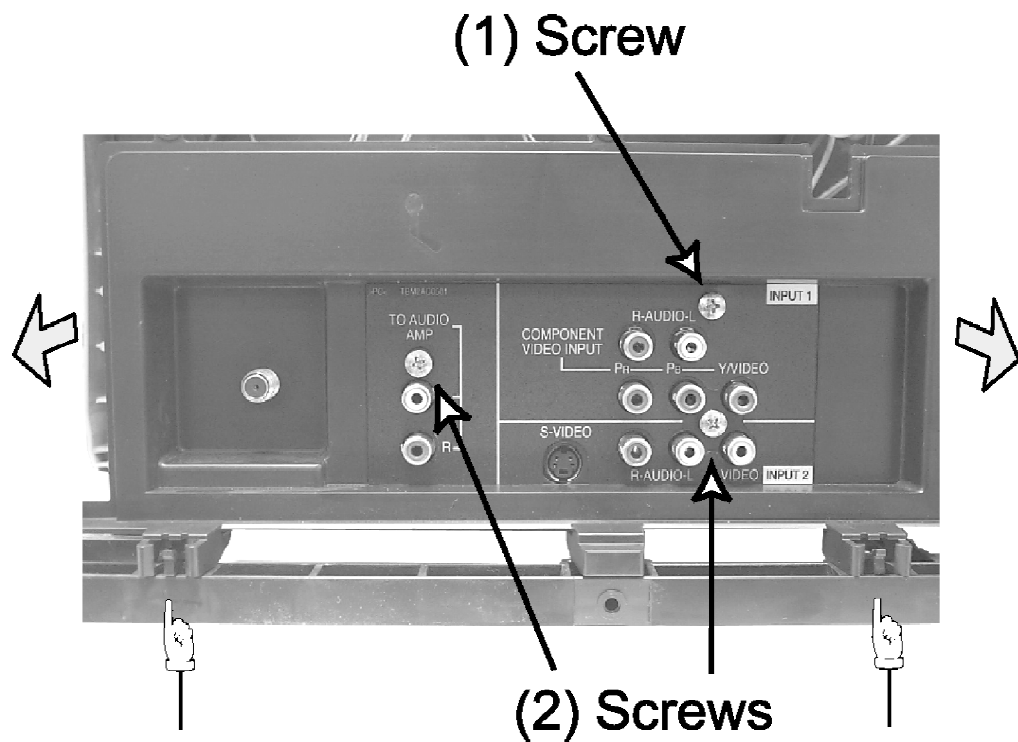
8. Replace the components on CRT neck and reinstall into cabinet.
Verify that all ground wires and circuit board plugs get connected.

IMPORTANT NOTICE

When ordering the CRT, please order CRT and CRT kit also.
Please see parts list section for part numbers.

9.2. Back cover removal

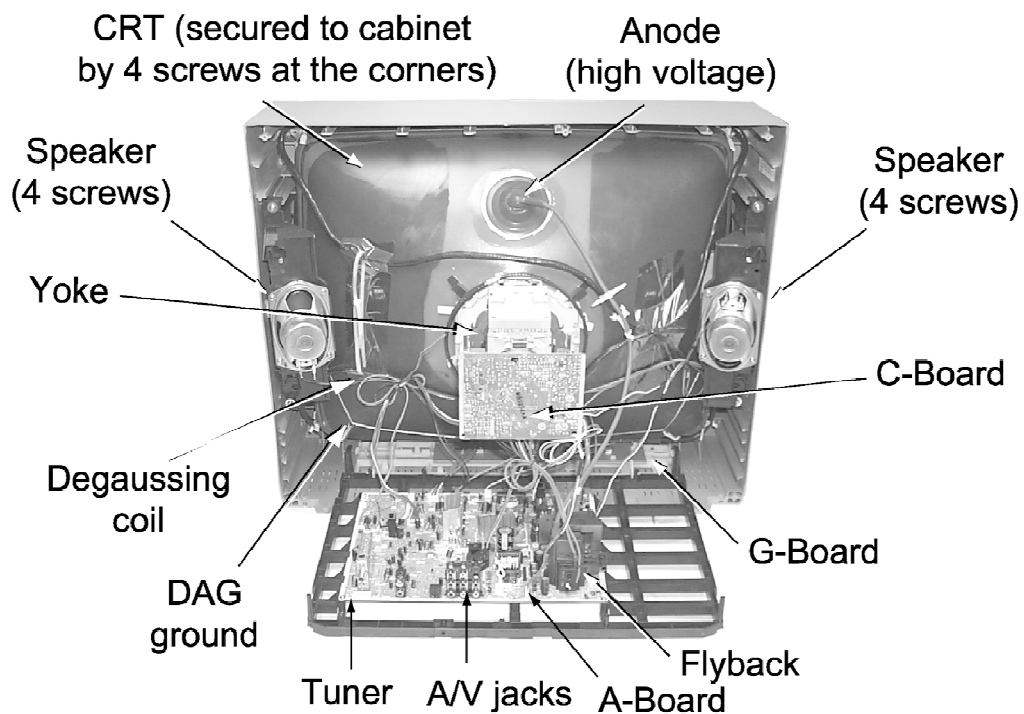




To Remove the A/V Cover:

1. Remove 3 screws as indicated in the picture.
2. Press the lower tabs on the cover .
3. Pull cover backward the set.

9.3. Inside View



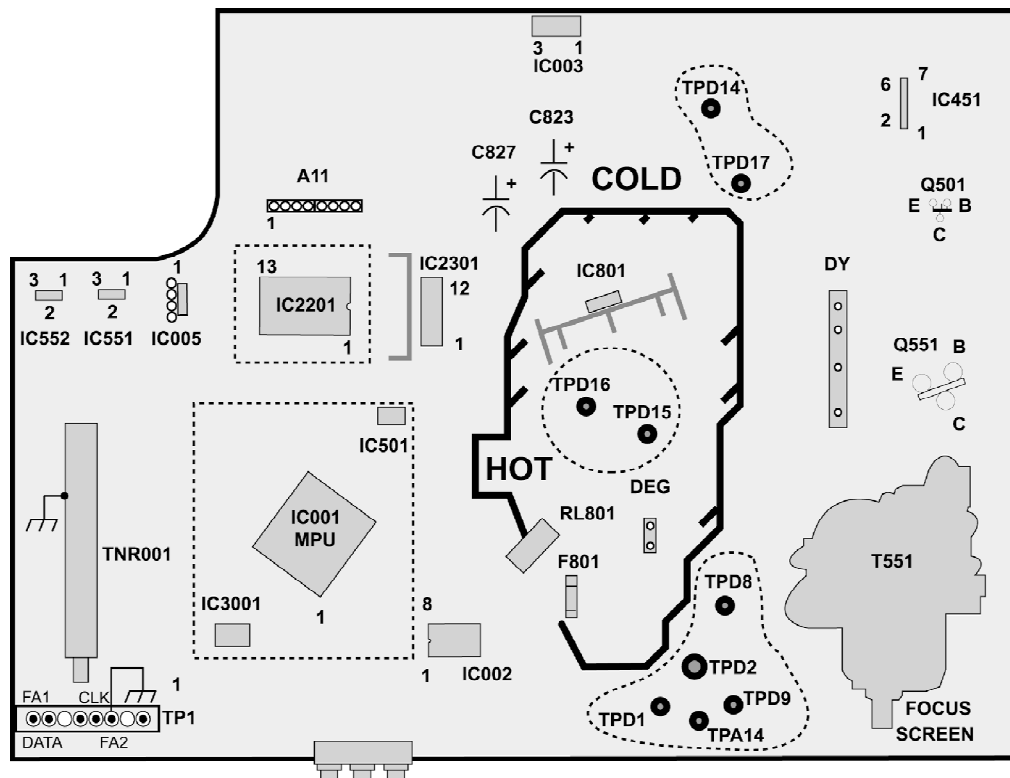
10. Chassis service adjustment procedures

All service adjustments are factory preset and should not require adjustment unless controls and/or associated components are replaced.

Note:

Connect the (-) lead of the voltmeter to the appropriate ground. Use IC801's heat sink when the HOT ground symbol is used. Otherwise, use COLD ground (tuner shield, IC451's heat sink or FA2).

Component and voltage test points



Note:

Components and test points within dotted areas are located on trace side.

B+ voltage check

1. Set the BRIGHT and PICTURE to minimum by using the PICTURE menu.
2. Connect the DVM between C825 (+ side) or TPD14 and cold ground.
3. Confirm that B+ voltage is $131.0V \pm 2.0V$. This voltage supplies B+ to the horizontal output and flyback circuits.

Source voltage chart

120V AC line input. Set the BRIGHT and the PICTURE to minimum by using the PICTURE menu. Use cold or hot ground for the (-) lead of the DVM as needed.

A-BOARD	TEST POINT	VOLTAGE
		27" CRT
+B2	TPD14	131.0 $\pm$ 2.0V
SOUND	C823 (+)	22.7 $\pm$ 1.0V
STB12V	C827 (+)	12.8 $\pm$ 1.0 V
220V	TPA14	217 $\pm$ 10 V
VERTICAL	TPD8	27.4 $\pm$ 1.5V
9V	IC551 pin 3	9.0 $\pm$ 0.5V
5V	IC552 pin 3	5.0 $\pm$ 0.5V
3.3V	IC005 pin 2	3.3 $\pm$ 0.3V
EHT	CRT anode	29.25 $\pm$ 1.25kV
HEATER	JK351 H-HGND	6.0 $\pm$ 0.24V

High voltage check

1. Select an active TV channel and confirm that horizontal is in sync.
2. Adjust BRIGHTNESS and CONTRAST using PICTURE icon menu so video just disappears.
3. Using a high voltage meter confirm that the high voltage is 29.25 $\pm$ 1.25kV for 27".

11. Service mode (electronic adjustments)

This receiver has electronic technology using the IC bus concept. It performs as a control function and it replaces many mechanical controls. Instead of adjusting mechanical controls individually, many of the control functions are now performed by using "on screen display menu". (The service adjustment mode).

NOTE

It is suggested that the technician reads all the way through and understand the following procedure for entering/exiting the service adjustment mode; then proceed with the instructions working with the receiver. When becoming familiar with the procedure, the flow chart for service mode may be used as a quick guide.

Quick entry to service mode

When minor adjustments need to be done to the electronic controls, the method of entering the service mode without removal of the cabinet back is as follows using the remote control:

1. Select SET-UP icon and select CABLE mode.
2. Select TIMER icon and set SLEEP time for 30 Min.
3. Press "ACTION" twice to exit menus.
4. Tune to the channel 124.

5. Adjust VOLUME to minimum (0).

6. Press VOL → (decrease) on receiver. Red “CHK” appears in upper corner.

To toggle between aging and service modes:

While the “CHK” is displayed on the left top corner of the CRT, pressing “ACTION” and “VOL” UP on the TV simultaneously will toggle between the modes. Red “CHK” for service and yellow “CHK” for aging.

7. Press POWER on the remote control to display the service adjustment modes menu, select adjustment by pressing the volume right/left buttons and channel up/down buttons on the remote and ACTION to enter the adjustment.

MTS	MTSIN	SEPAL	SEPAH	
CLOCK	CLOCK			HHSTH
VIDEO	COLOR	TINT	BRIGH	CONT
	B-Y_G	CUT_G	CUT_R	CUT_B
	BRT	R-DR	B-DR	
HDEF	H-POS	H-WID	PCC	
	TOPG	BTMG	TRAP	
FINE	PCCHG	PCCLG	PCCHS	PCCLS
	TOPSL	BTMSL		
VDEF	VEAMP	V-C	V-S	VPOS
SETID	ID1	ID2	ID3	

Exiting the service mode:

This TV goes out from service mode when it is unplugged or turned OFF. To exit the service mode, turn the TV OFF or unplug the TV from A.C.

Other method

Press ACTION and POWER on the receiver simultaneously for at least 2 seconds.

The receiver momentarily shuts off; then comes back on tuned to channel 3 with a preset level of sound.

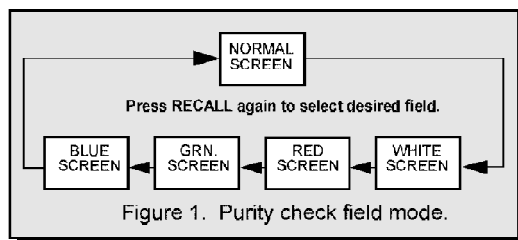
Any programmed channels, channels caption data and some others user defined settings will be erased when exited by pressing ACTION and POWER on receiver.

IMPORTANT NOTE

Always check that the TV exits the service mode.

To confirm colors

When in service mode (red “CHK” is displayed) press **RECALL** on the remote control to enter the purity field check mode



Entering service mode (open-back method)

While the receiver is connected and operating in normal mode, momentarily short test point FA1 (TP1 pin 2) to cold ground (TP1 pin 3).

The receiver enters the aging mode.

Yellow letters “CHK” appear in the upper left corner of the screen. / (The volume right/left and channel up/down will adjust rapidly).

Note:

If service mode is accessed by this method be sure to reset the set after service is performed.

11.1. Service adjustment default values for items

NAME	DESCRIPTION	REGISTER VALUE
		CT-27SC14J/UJ
MTSIN	MTS INPUT LEVEL	2A
SEPAL	MTS LOW LEVEL SEPARATION	0B
SEPAH	MTS HIGH LEVEL SEPARATION	24
CLOCK	CLOCK	128
HHSTH	HHS VOLTAGE LEVEL REFERENCE	94
COLOR	COLOR	00 F0
TINT	TINT	56
BRIGH	SUB-BRIGHTNESS	35
CONT	SUB-CONTRAST	60
B-Y_G	MAGENTA TINT ADJ	80
CUT_G	GREEN CUT-OFF	02 1A
CUT_R	RED CUT-OFF	02 75
CUT_B	BLUE CUT-OFF	02 42
BRT	BRIGHT	35
R-DR	RED DRIVE	09 00
B-DR	BLUE DRIVE	08 00
H-POS	HORIZONTAL POSITION	82
H-WID	HORIZONTAL WIDTH	3C
PCC	PINCUSHION	5D
TOPG	TOP CORNER PINCUSHION	97

NAME	DESCRIPTION	REGISTER VALUE
		CT-27SC14J/UJ
BTMG	BOTTOM CORNER PINCUSHION	B4
TRAP	TRAPEZOID	82
PCCHG	PINCUSHION HIGH	02
PCCLG	PINCUSHION LOW	02
PCCHS	PINCUSHION HIGH	05
PCCLS	PINCUSHION LOW	00
TOPSL	TOP CORNER PINCUSHION SLICE LEVEL	2D
BTMSL	BOTTOM CORNER PINCUSHION SLICE LEVEL	06
VEAMP	VERTICAL SIZE	42
V-C	VERTICAL LINEARITY	4B
V-S	VERTICAL SIZE CORRECTION	10
VPOS	VERTICAL POSITION	7F
ID1*	ID SWITCH 1	FC
ID2*	ID SWITCH 2	7F
ID3*	ID SWITCH 3	7B

IMPORTANT:

These table values are approximated and could change due to variation of electrical characteristics in each set, except for the ID switch values.

***Note:**

The correspondent ID switch (ID1, ID2, ID3) data configuration should not be modified in any way. If EEPROM circuit needs to be replaced, these ID values should be configured according with this table.

12. Service adjustments (electronic controls)

NOTE

Please correlate with available pattern on all adjustments

12.1. Sub-Brightness and Contrast / Service DAC adjustment (BRIGH, CONT)

Adjustment of this control is important for setting proper operation of customer brightness and picture controls. Do not adjust the SCREEN VR after the sub-brightness is set.

This adjustment is factory set. Do not adjust unless repairs are made to associated circuit, the CRT Board or when the CRT is replaced.

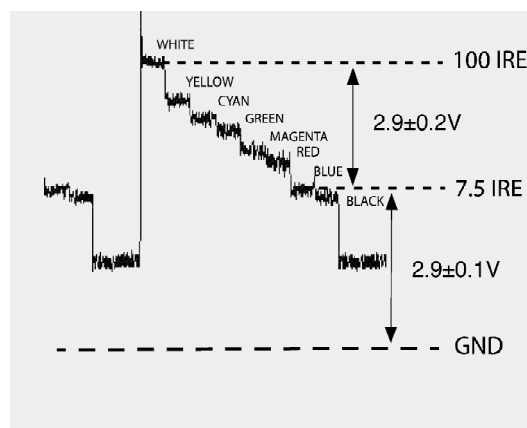
Preparation

1. Apply a colorbar pattern.

2. Set the PICTURE control to the maximum.
3. Set COLOR control to minimum (no color on picture).
4. Set the BRIGHTNESS control to the center.
5. Set the SHARPNESS control to the center.
6. Connect the oscilloscope to TP35.

Procedure

1. In the service mode, select DAC for brightness adjustment "BRIGH", and adjust data to obtain $2.9 \pm 0.1V$ between 7.5IRE and GND level at TP35. (See waveform detail).
2. In service mode, select DAC for contrast adjustment "CONT", and adjust data to obtain $2.9 \pm 0.2V$ between 7.5IRE and 100IRE level at TP35. (See waveform detail)



12.2. Color output adjustment / Service DAC adjustment (COLOR, TINT)

NOTE

if a rainbow pattern generator is available perform the following procedure; the next section describes the procedure with no rainbow pattern.

Make sure that sub-contrast adjustment was finished prior to perform this adjustment.

PREPARATION

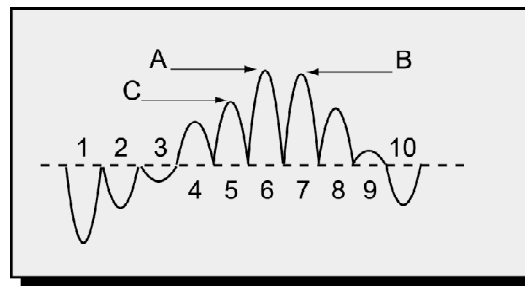
1. Normalize the picture settings.
2. Set the BRIGHTNESS control to minimum.

3. Set the COLOR control to the center.
4. Set the TINT control to the center.
5. Set the PICTURE control to the maximum.
6. Set the SHARPNESS control to the minimum.

PROCEDURE

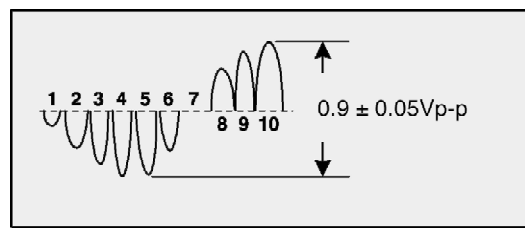
1. Apply a rainbow color bar pattern.
2. Connect the oscilloscope to TP37.
3. In service mode adjust "TINT" register until the waveform measured is as the one shown. Tint level from C and B peaks must be almost in the same level and from A to C 0.35 Vpp).

TP37 Waveform.



4. Connect the oscilloscope to TP35 and GND.
5. Adjust "COLOR" register so that the amplitude is $0.9 \pm 0.05 \text{ Vp-p}$.

TP35 Waveform.



12.3. Color output adjustment / Service DAC adjustment / (COLOR, TINT, B-Y_G)

NOTE

Color and tint adjustment sets the reference settings for the user controls; It is important to read the procedures.

(NO RAINBOW PATTERN)

Make sure that sub-contrast adjustment was finished prior to perform this adjustment

PREPARATION

Normalize the picture settings.

PROCEDURE

1. Apply a color bar pattern.
2. In service mode adjust "R DR" and "B DR" data to "80".
3. In service mode adjust "TINT" data so that the color does not become greenish or redish.
4. In service mode adjust "COLOR" data so that the color level is not too high (saturated) or too low (tending to black and white).
5. In service mode adjust "B-Y G" data so that blue and green seem natural.
6. Confirm that saturation and picture are normal (normal image).
7. If image is not satisfactory, repeat adjustment until the image is normal and natural.

NOTE

The image can be compared against other set to see the image quality.

12.4. Color temperature adjustment / (B / W Tracking) / Service DAC Adjust. / (CUT R) (CUT G) (CUT B) (R DR) (B DR)

Minor Touch-Up Method

OBSERVE low and high brightness areas of a B/W picture for proper tracking. Adjust only as required for "good gray scale and warm highlights".

1. **LOW LIGHT** areas - In service mode for making electronic adjustments, select CUT R, CUT G, CUT B and adjust the picture for gray.
2. **HIGH LIGHT** areas - In service mode for making electronic

adjustments, select drive R DR, B DR and adjust the picture for warm whites.

Complete adjustment

PREPARATION

1. Turn the receiver "ON" and allow 30 minutes warm up at WHITE PATTERN.
2. Apply a color bar pattern (with no color).
3. Turn the SCREEN control (part of FBT T551) fully counterclockwise.
4. Preset the following service DACs for best results:

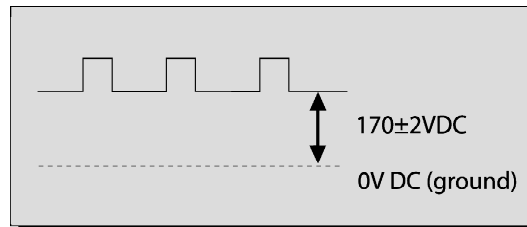
- BRIGH	1 D0
- CUT R	02 00
- CUT G	02 00
- CUT B	02 00
- R DR	07 FF
- B DR	07 FF

PROCEDURE

1. Connect the oscilloscope to KG (CRT-Board).
2. In service mode for making electronic adjustment, select "BRIGH" DAC.
3. Press RECALL button on the remote control to collapse the raster. (service SW).
4. Connect oscilloscope to KG on C-Board and adjust service mode "CUT-G" DAC until $170 \pm 2V$ above DC ground is measured
5. Remove the probe from KG.
6. Turn screen clockwise slowly until color is slightly appeared.
7. Then adjust "CUT R" and "CUT B" until line becomes white.
8. Press RECALL button on the remote to restore the raster.
9. Adjust "R DR" and "B DR" so the white seems like white and black like black.

10. Apply a normal signal and confirm that the image is normal and a good gray scale

11. If correction is needed perform minor touch-up method.



12.5. Deflection adjustments

To reset deflection adjustments

To reset deflection adjustments to factory adjusted default, enter to service mode (with red CHK displayed), press POWER button on remote to display the service menu, then press and hold RECALL button for at least three seconds, a reset message will appear in the image.

Use this feature when deflection adjustment gets off adjustment to the point that it cannot be adjusted back easily.

12.5.1. H-Center adjustment

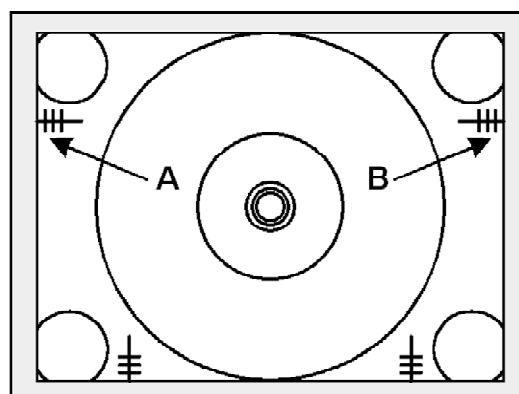
PREPARATION

1. Apply a crosshatch pattern.
2. Normalize the picture settings.

PROCEDURE

1. Apply a pattern that permits to center the picture.

Horizontal Center Adjustment



2. If the horizontal center is not aligned, in service mode adjust “H POS” DATA to adjust the horizontal center of the monoscope pattern to the CRT center.
3. Verify that horizontal width (A & B mark) is within 4.5 ± 0.7 .

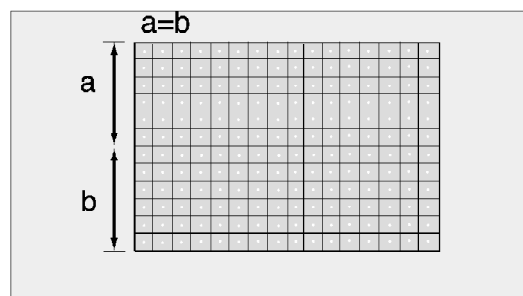
12.5.2. Vertical linearity(V-C), V-Size and V-Position adjustment

PREPARATION

1. Apply a crosshatch pattern
2. Normalize the picture settings.

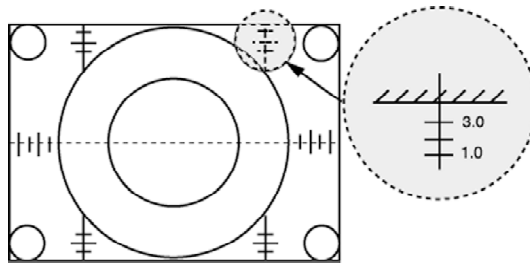
PROCEDURE

1. Enter service mode, select DAC adjustment / “V-POS” and adjust monoscope pattern to the center vertical position of the CRT center mark.
2. Adjust linearity data “V-C” so that interval of “a” is same as “b” (a =b).



3. If the v-position is not at the CRT center, adjust / V position “V POS” DATA again.
4. Apply a monoscope pattern.
5. Confirm that center horizontal line is in center mark on CRT.
6. Adjust “VEAMP” register for correct vertical size by making monoscope round circle leaving 4 marks off the CRT edge.

Vertical centering adjustment.



12.5.3. V-S Correction adjustment

PREPARATION

1. Apply a crosshatch pattern
2. Normalize the picture settings.

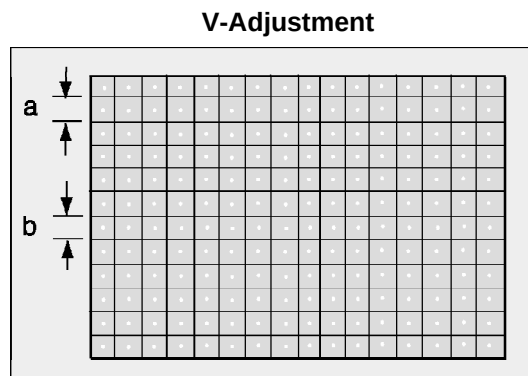
PROCEDURE

1. Enter to service mode
2. Check a and b sizes, If $b-a < -1.5\text{mm}$ (in top & bottom extending case)
 - Increase "V-S" DATA by one step

NOTE

Repeat "a" and "b" until $b-a \pm 1.5\text{mm}$

3. Confirm to make outermost circle of monoscope pattern a correct circle



12.6. MTS circuit adjustments

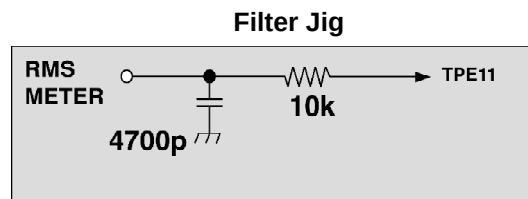
The MTS circuit adjustments require two steps:

1. Input level adjustment.
2. Stereo separation adjustment.

Input level adjustment / Service DAC adjustment (MTSIN)

PREPARATION

1. Connect an RMS meter with filter jig as shown in figure to TPE11.



2. Connect an RF signal generator to the RF antenna input.

PROCEDURE

1. Apply the following signal from the RF signal generator:
 - Video: 100 IRE flat field, 30% modulation.
 - Audio: 300Hz, 100% modulation, monaural (70 ±5dB, 75 Ω OPEN, P/S 10dB). Make sure that the 75 μ s pre-emphasis is OFF.
2. Adjust the MTS input level adjustment “MTSIN” data until the RMS voltage measured is 120 ± 4.0mVrms.

Stereo separation adjustment (SEPAH)

PREPARATION

1. Connect an R.F. signal generator to the RF antenna input.
2. Connect a scope to TPE10.

PROCEDURE

1. Select stereo mode in audio menu

2. Apply the following signal from the RF signal generator:

- Video: 100 IRE flat field, 30% modulation.
- Audio: 300Hz, 30% modulation, stereo (left only) ($70 \pm 5\text{dB}$, 75 Ω OPEN, P/S 10dB).

NOTE

After setting 30% modulation with P.L. SW and N.R. SW OFF, turn P.L. SW and N.R. SW ON.

3. In service mode, adjust the MTS Low-Level separation adjustment “SEPAL” data until the amplitude displayed on the scope is minimum.

4. Apply the following signal from the RF signal generator:

- Video: 100 IRE flat field, 30% modulation
- Audio: 3KHz, 30% modulation, stereo (left only) ($70 \pm 5\text{dB}$, 75 Ω OPEN, P/S 10dB).

NOTE

After setting 30% modulation with P.L. SW and N.R. SW OFF, turn P.L. SW and N.R. SW ON.

5. Adjust the MTS High-level separation adjustment “SEPAH” until the amplitude displayed on the scope is minimum.

6. Repeat above steps 2 through 5 until the amplitude is at minimum for both signals.

12.7. Clock adjustment (CLOCK)

PREPARATION

Connect the frequency counter from TP017 / (IC001 pin 79) to cold ground

PROCEDURE

1. Turn the receiver “OFF” with the A.C. power applied.

2. Measure TP017 (IC001 pin 79) for the frequency of the waveform and record the reading.

NOTE

3. TP017 (IC001 pin 79) measurement must have at least four digits of resolution following the decimal point. Example: 000.0000
4. Place the receiver into service mode for making electronic adjustment, select the clock adjustment DAC "CLOCK".
5. Calculate and set "CLOCK" based on the following formula:

$$\text{CLOCK} = 128 - \left[\frac{(\text{TP017}_{freq} - 610.35)}{610.35} \times 450000 \right]$$

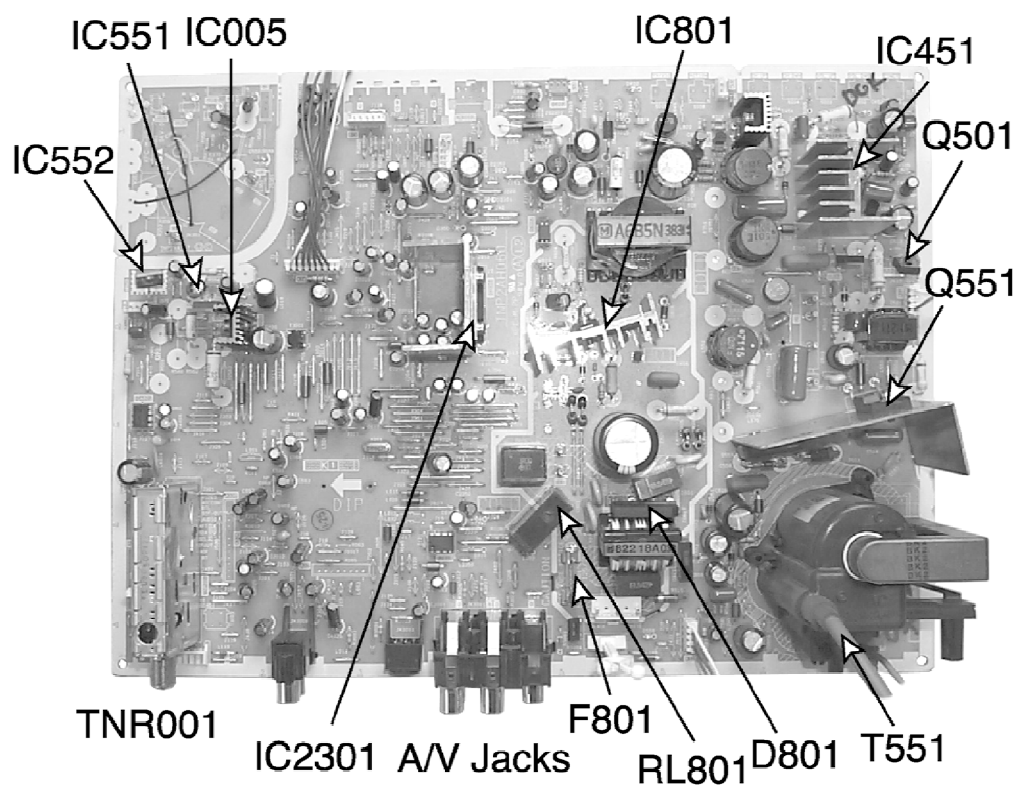
NOTE

TP017 (IC001 pin 79) measurement will not change regardless of the value stored in CLOCK.

13. Identification of main components

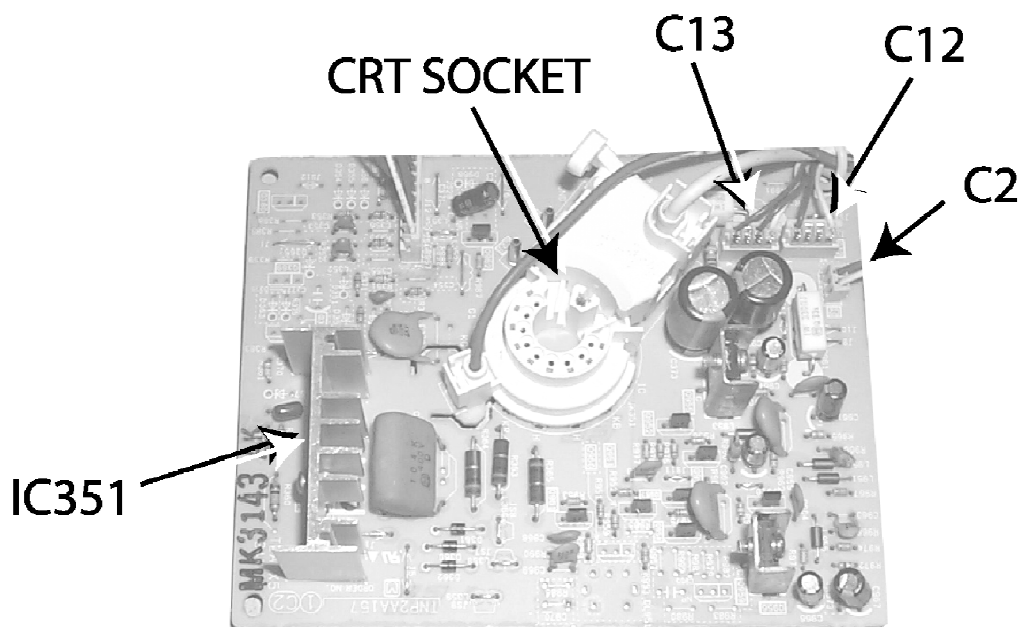
13.1. A-Board main components

A-Board main components



13.2. C-Board main components

C-Board main components



14. Reference for PDF colors

DESCRIPTION OF PDF LINK COLORS	
TYPE	DESTINATION
SCHEMATIC	
YELLOW ON IC	IC ON PCB
YELLOW ON CONNECTOR	CONNECTOR ON PCB
YELLOW ON SCHEMATIC	PCB
CYAN	WAVEFORM
GREEN ON SIDE	SCHEMATIC CONTINUED
GREEN ON CONNECTOR	CONNECTOR CONNECTION
BLUE ON IC	VOLTAGE
PCB	
BLUE ON IC	IC ON SCHEMATIC
BLUE ON CONNECTOR	CONNECTOR ON SCHEMATIC
BLUE ON PCB	SCHEMATIC
GREEN ON SIDE	PCB CONTINUED
BLOCK DIAGRAMS	
GREEN ON IC	IC ON SCHEMATIC
GREEN ON SIDE	BLOCK DIAGRAM CONTINUED

15. Conductor views

15.1. A-Board printed circuit (1 of 2)

15.2. A-Board printed circuit (2 of 2)

15.3. C-Board printed circuit

16. Block diagrams

16.1. Video Signal Block Diagram

16.2. Audio Signal Block diagram

17. Schematics

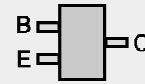
17.1. English schematic notes

Notes:

IMPORTANT SAFETY NOTICE

THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES THAT ARE IMPORTANT FOR PROTECTION FROM X-RADIATION, FIRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFACTURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS DESIGNATED WITH A Δ IN THE SCHEMATIC.

CHIP TRANSISTOR LEAD DESIGNATION



SCHEMATIC NOTES

- Resistors are carbon 1/4W unless noted otherwise.
 - Capacitors are ceramic 50V unless noted otherwise.
 - Coil value notes is inductance in μ H.
 - Test point indicated by $\uparrow$; Test point but no pin $\uparrow$.
 - Components indicated with Δ are critical parts and replacement should be made with manufacture specified replacement parts only.
 - (BOLD LINE) indicates the route of B+ supply.
 - The schematic diagrams are current at the time of printing and are subject to change without notice.
 - Ground symbol $\downarrow$ indicates **HOT GROUND CONNECTION**; $\uparrow$ indicates COLD GROUND.
- NOTE: All other component symbols are used for engineering design purposes.*

VOLTAGE MEASUREMENTS

- Voltage measurement:
 - AC input to the Receiver is 120V. NTSC (HD, 1125i & 525P when applicable) signal generator is connected to the antenna of the Receiver. (Color bar pattern of 100 IRE white and 7.5 IRE black.)
 - All Picture and Audio adjustments are set to Normalize.
 - TV ANT/CABLE - (Set-Up Menu) in TV/ANT Mode
 - Volume - Min.
 - TV/Video SW - TV position
 - Audio Mode - Stereo
 - Voltage readings are nominal and may vary $\pm 10\%$ on active devices. Some voltage reading will vary with signal strength and picture content.
 - Supply voltages are nominal.
 - Ground symbol $\downarrow$ indicates ground lead connection of meter. Incorrect ground connection will result in erroneous readings.
- CAUTION: Incorrect ground connection of the test equipment will result in erroneous readings.**

WAVEFORM MEASUREMENTS

- $\textcircled{3}$ indicates waveform measurement. (Measurement can be taken at the best accessible location in common to the indicated point.)
 - Taken with an NTSC signal generator connected to the antenna terminal. (NTSC color bar pattern of 8 bars of EIA colors, 100 IRE white and 7.5 IRE black.)
 - Customer Controls (Picture/Audio Menu) are set to Normalize. Volume is set to "MIN".
 - All video and color waveforms are taken with a wideband scope and a probe with low capacitance (10 to 1). Shape and peak altitudes may vary depending on the type of Oscilloscope used and its settings.
 - Ground symbol $\downarrow$ shown on waveform number indicates (Hot) ground lead connection of the Oscilloscope.
- CAUTION: Incorrect ground connection of the test equipment will result in erroneous readings.**



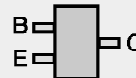
17.2. Notas de esquem á ticos en espa ñ ol

Notas

NOTA DE SEGURIDAD

LOS DIAGRAMAS ELÉCTRICOS INCLUYEN CARACTERÍSTICAS ESPECIALES MUY IMPORTANTES PARA LA PROTECCIÓN CONTRA RAYOS-X, QUEMADURAS Y DESCARGAS ELÉCTRICAS. CUANDO SE DE SERVICIO ES IMPORTANTE USAR PARA REEMPLAZO DE COMPONENTES CRÍTICOS, SOLO PARTES ESPECIFICADAS POR EL FABRICANTES. LOS COMPONENTES CRÍTICOS ESTAN SEÑALADOS EN LOS DIAGRAMAS POR EL SÍMBOLO ⚠.

IDENTIFICACIÓN DE TERMINALES PARA TRANSISTORES EN CHIP



NOTAS DE LOS DIAGRAMAS

- Las Resistencias son de Carbón de 1/4W, a menos que se indique otra característica.
 - Los Capacitores son de Cerámica para 50V, a menos que se indique otra característica.
 - El valor indicado de las Bobinas es la inductancia expresada en μH .
 - Los puntos de prueba en la terminal de algún componente son indicados por Los puntos de prueba fuera de los componentes se indican con .
 - Los componentes señalados con el símbolo ⚠ son considerados componentes críticos y deben ser reemplazados sólo con las partes especificadas por el fabricante.
 - (LINEA GRUESA) indica las líneas de alimentación de los Voltajes B+.
 - Los diagramas eléctricos están sujetos a cambio sin previo aviso.
 - El símbolo indica que es una conexión a **Tierra Caliente** y el símbolo indica conexión a **Tierra Fría**.
- NOTA:** Los demás símbolos de componentes incluidos son usados con fines de diseño.

MEDICIÓN DE VOLTAJES

- Medición de voltaje:
 - El voltaje de entrada al Receptor es de 120V de Corriente Alterna. Un generador de patrones con formato NTSC se conecta a la entrada de la antena. (Patrón de Barras de Colores con 100 IREs para el Blanco y 7.5 IREs para el Negro.)
 - Los ajustes de los Menus Picture y Audio se normalizan. En el Menú Set-Up, en la opción ANTENA, se selecciona el modo de CABLE. El nivel de Volumen se minimiza. De los modos TV y Video, seleccionar el modo TV. Seleccionar modo Estereo del Audio.
 - Las mediciones de los voltajes son nominales y pueden variar hasta 10% en componentes en funcionamiento. Las lecturas de los voltajes pueden variar por la potencia de la señal y el contenido de la imagen.
 - Las fuentes de voltajes son nominales.
 - El símbolo indica el tipo de tierra que se utiliza en la conexión del medidor.
- PRECAUCION:** Si no se utiliza la conexión a la tierra adecuada, se obtendrán mediciones equivocadas y podría dañar el equipo de medición.

MEDICIÓN DE FORMAS DE ONDA

- Un símbolo como indica el punto para medir una señal. (La medición puede hacerse en el punto con mayor accesibilidad, siempre que sea común al indicado.)
 - Se midieron utilizando un generador con formato NTSC conectado a la terminal de la antena. (Patrón de 8 Barras de Colores EAI, formato NTSC de 100 IREs para el Blanco y 7.5 IREs para el Negro.)
 - Los ajustes de usuario de los Menus PICTURE y AUDIO se normalizaron. Posteriormente el nivel de volumen se ajusta al mínimo.
 - Las formas de onda de Video y Color fueron tomadas con un osciloscopio de banda alta y con un punta de prueba de baja capacitancia (10 a 1). La forma y amplitud de las ondas puede variar según el tipo de osciloscopio que se utilice y sus características.
 - El símbolo de tierra que aparece junto al número de la forma de onda, indica que se utiliza conexión a **Tierra Caliente** en el extremo negativo de la punta de prueba.
- PRECAUCION:** Si no se utiliza la conexión a la tierra adecuada, se obtendrán mediciones equivocadas y podría dañar el equipo de medición.

17.3. A-Board schematic TNP2AH060MC (1 of 4)

17.4. A-Board schematic TNP2AH060MC (2 of 4)

17.5. A-Board schematic TNP2AH060MC (3 of 4)

17.6. A-Board schematic TNP2AH060MC (4 of 4)

17.7. C-Board schematic TNP2AA157AP (1 of 2)

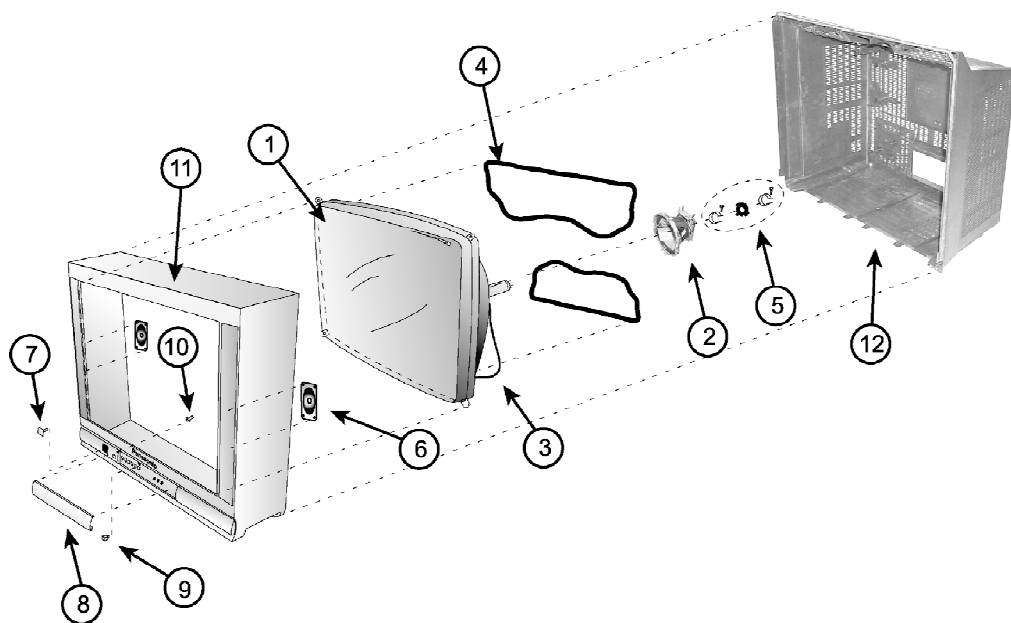
17.8. C-Board schematic TNP2AA157AP (2 of 2)

17.9. G-Board schematic TNP2AA188

17.10. Voltages

17.11. Waveforms

18. Parts location



19. Parts list

19.1. Parts list notes

Important Safety Notice

Components identified by  mark have special characteristics important for safety.
When replacing any of these components, use manufacturer's specified parts.

Abbreviation of part name and description

1. Resistor

Example :
ERD25TJ104 **C** 100K Ω , **J**, 1/4W
Type Allowance

Type	Allowance
C : Carbon	F : $\pm 1\%$
F : Fuse	G : $\pm 2\%$
M : Metal Oxide Metal Film	J : $\pm 5\%$ K : $\pm 10\%$
S : Solid	M : $\pm 20\%$
W : Wire Wound	

2. Capacitor

Example :
ECKF1H103ZF **C** 0.01 μ F, **Z**, 50V
Type Allowance

Type	Allowance
C : Carbon	C : $\pm 0.25\text{pF}$
E : Electrolytic	D : $\pm 0.5\text{pF}$
P : Polyester Polypropylene	F : $\pm 1\text{pF}$ G : $\pm 3\%$
T : Tantalum	J : $\pm 5\%$ K : $\pm 10\%$ L : $\pm 15\%$ M : $\pm 20\%$ P : $\pm 100\%$, -0% Z : $\pm 80\%$, -20%

19.2. Parts list

Ref. No.	Part No.	Part Name & Description	Remarks
CAPRISTORS			
CRA801	TP00842-51	CAPRISTOR	
CAPACITORS			
C003	ECA1HM4R7B	CAP,E 4.7UF-50V	
C004	TCJ2VC1H150J	CAP,C 15PF-J-50V	
C005	TCJ2VC1H150J	CAP,C 15PF-J-50V	
C008	TCJ2VF1H103Z	CAP,C .01UF-Z-50V	
C009	ECJ2VB1C104K	CAP,C .1UF-K-16V	
C009	ECJ2VF1H104Z	CAP,C .1UF-Z-50V	
C010	TCJ2VC1H680J	CAP,C 68PF-J-50V	
C011	TCJ2VC1H680J	CAP,C 68PF-J-50V	
C012	ECJ2VB1C104K	CAP,C .1UF-K-16V	
C016	ECA1AM101B	CAP,E 100UF-10V	
C018	TCJ2VF1H103Z	CAP,C .01UF-Z-50V	
C019	ECA0JM102B	CAP,E 1000UF-6.3V	
C020	ECA1CM102B	CAP,E 1000UF-16V	
C021	TCJ2VF1H103Z	CAP,C .01UF-Z-50V	
C031	TCJ2VC1H220J	CAP,C 22PF-J-50V	
C032	ECA1AM470B	CAP,E 47UF-10V	
C034	TCJ2VC1H390J	CAP,C 39PF-J-50V	
C035	TCJ2VC1H120J	CAP,C 12PF-J-50V	
C038	ECA1CM470B	CAP,E 47UF-16V	
C039	TCJ2VB1H221K	CAP,C 220PF-K-50V	
C041	ECA1HM2R2B	CAP,E 2.2UF-50V	

Ref. No.	Part No.	Part Name & Description	Remarks
C043	ECJ2VF1C105Z	CAP,C 1.0UF-Z-16V	
C044	ECA0JM102B	CAP,E 1000UF-6.3V	
C046	TCJ2VF1H103Z	CAP,C .01UF-Z-50V	
C048	ECJ2VF1C105Z	CAP,C 1.0UF-Z-16V	
C051	ECJ2VF1C105Z	CAP,C 1.0UF-Z-16V	
C052	ECA1CM101B	CAP,E 100UF-16V	
C053	ECJ2VF1C105Z	CAP,C 1.0UF-Z-16V	
C054	ECJ2VF1C105Z	CAP,C 1.0UF-Z-16V	
C055	ECJ2VF1C105Z	CAP,C 1.0UF-Z-16V	
C056	ECJ2VF1C105Z	CAP,C 1.0UF-Z-16V	
C057	ECEA1CN100UB	CAP,E 10UF-16V	
C058	ECEA1CN100UB	CAP,E 10UF-16V	
C059	ECJ2VF1C105Z	CAP,C 1.0UF-Z-16V	
C060	ECEA1CN220UB	CAP,E 22UF-16V	
C061	ECA1HM100B	CAP,E 10UF-50V	
C062	ECA1HM100B	CAP,E 10UF-50V	
C063	ECJ2VF1C104Z	CAP,C .1UF-Z-16V	
C064	ECA1CM101B	CAP,E 100UF-16V	
C066	TCJ2VC1H330J	CAP,C 33PF-J-50V	
C067	TCJ2VC1H680J	CAP,C 68PF-J-50V	
C068	ECA1CM100B	CAP,E 10UF-16V	
C069	TCJ2VB1H221K	CAP,C 220PF-K-50V	
C070	ECJ2VF1C104Z	CAP,C .1UF-Z-16V	
C071	TCJ2VF1H103Z	CAP,C .01UF-Z-50V	
C072	TCJ2VB1H221K	CAP,C 220PF-K-50V	
C073	TCJ2VC1H101J	CAP,C 100PF-J-50V	
C075	ECJ2VC1H151J	CAP,C 150PF-J-50V	
C077	ECA1HM100B	CAP,E 10UF-50V	
C079	TCJ2VC1H220J	CAP,C 22PF-J-50V	
C083	TCJ2VF1H103Z	CAP,C .01UF-Z-50V	
C085	ECJ2VB1C104K	CAP,C .1UF-K-16V	
C351	TACCV470T50V	CAP,C 47PF-J-50V	
C352	TACCV330T50V	CAP,C 33PF-K-50V	
C353	TACCV330T50V	CAP,C 33PF-K-50V	
C359	ECA1CM471B	CAP,E 470UF-16V	
C359	ECQM4104KZB	CAP,P .10UF-K-400V	
C360	ECA1HM4R7B	CAP,E 4.7UF-50V	
C368	ECQV1H224JL3	CAP,P .22UF-J-50V	
C370	ECKW3D102KBN	CAP,C 1000PF-K-2KV	
C371	ECEA1HN010UB	CAP,E 1UF-50V	
C373	ECA2EM470E	CAP,E 47UF-250V	
C403	ECEA1CN220UB	CAP,E 22UF-16V	
C411	ECQB1H683JF3	CAP,P .068UF-J-50V	
C451	ECA1HM010B	CAP,E 1UF-50V	
C452	ECA1CM220B	CAP,E 22UF-16V	
C454	ECA1VHG101B	CAP,E 100UF-35V	
C455	ECA1EM102E	CAP,E 1000UF-25V	
C458	ECA1HM010B	CAP,E 1UF-50V	
C459	ECA1VHG471B	CAP,E 470UF-35V	
C460	ECQB1224KF3	CAP,P .22UF-K-100V	
C461	ECQB1104JF3	CAP,P .10UF-J-100V	
C462	TCJ2VF1H103Z	CAP,C .01UF-Z-50V	
C501	ECJ2VB1H221K	CAP,C 220PF-K-50V	
C505	ECQB1H104JF3	CAP,P .10UF-J-50V	

Ref. No.	Part No.	Part Name & Description	Remarks
C506	ECKR2H102KB5	CAP,C 1000PF-K-500V	
C510	ECCR2H100D5	CAP,C 10PF-D-500V	
C512	ECA2CM100B	CAP,E 10UF-160V	
C531	ECA1HM4R7B	CAP,E 4.7UF-50V	
C540	TCJ2VF1H103Z	CAP,C .01UF-Z-50V	
C551	ECA1VM471B	CAP,E 470UF-35V	
C554	ECKR2H561KB5	CAP,C 560PF-K-500V	
C555	ECA2EM220E	CAP,E 22UF-250V	
C556	ECA1CM471B	CAP,E 470UF-16V	
C557	ECKR2H102KB5	CAP,C 1000PF-K-500V	
C558	ECQE2473JFB	CAP,P .47UF-J-400V	
C560	ECQB1104JF3	CAP,P .10UF-J-100V	
C561	ECEA1HN010UB	CAP,E 1UF-50V	
C562	ECKR2H561KB5	CAP,C 560PF-K-500V	
C563	ECWH20123JVB	CAP,P .012UF-J-2KV	
C564	ECWH20182JVB	CAP,P .1800PF-J-2KV	
C565	ECKW3D681JBR	CAP,C 680PF-J-2KV	
C566	ECKW3D181JBP	CAP,C 180PF-J-2KV	
C567	ECQM4682JZW	CAP,P .68UF-J-400V	
C568	ECQM4223JZW	CAP,P .022UF-J-400V	
C569	ECWF2274JSR	CAP,M .27UF-J-200V	
C570	ECA1CM221B	CAP,E 10UF-16V	
C571	ECA1CM220B	CAP,E 22UF-16V	
C572	ECA0JM221B	CAP,E 220UF-6.3V	
C573	ECA1CM101B	CAP,E 100UF-16V	
C575	ECKR2H471KB5	CAP,C 470PF-K-500V	
C576	ECKR2H471KB5	CAP,C 470PF-K-500V	
C593	ECA1CM470B	CAP,E 47UF-16V	
C605	TCJ2VF1H103Z	CAP,C .01UF-Z-50V	
C606	ECA0JM221B	CAP,E 220UF-6.3V	
C756	ECKR2H332KB5	CAP,C 3300PF-K-550V	
C759	ECQE1395KNB	CAP,P 3.95UF-K-100V	
C760	ECQM2104KZW	CAP,P .1UF-K-200V	
C763	ECKR3A121KBP	CAP,C 120PF-K-1KV	
C800	ECKR3A221KBP	CAP,C 220PF-K-1KV	
C801	ECKWAE472ZED	CAP,C .0047UF-Z-250V	
C802	ECKWAE472ZED	CAP,C .0047UF-Z-250V	
C803	ECKWAE472ZED	CAP,C .0047UF-Z-250V	
C805	EC0S2DA471BB	CAP,E 470UF-200V	
C806	ECQM4103KZW	CAP,P .01UF-K-400V	
C808	ECA1HM470B	CAP,E 47UF-50V	
C809	TACCW471T50V	CAP,C 470PF-K-50V	
C810	TACCW471T50V	CAP,C 470PF-K-50V	
C812	ECQU2A224MLA	CAP,P .22UF-M-250V	
C813	ECQU2A682MLA	CAP,P .0068UF-M-250V	
C815	ECQU2A224MLA	CAP,P .22UF-M-250V	
C820	ECA1CM101B	CAP,E 100UF-16V	
C821	TCJ2VF1H103Z	CAP,C .01UF-Z-50V	
C822	ECKR3A221KBP	CAP,C 220PF-K-1KV	
C823	ECA1VM471B	CAP,E 470UF-35V	

Ref. No.	Part No.	Part Name & Description	Remarks
C824	ECKR3A102KBP	CAP,C 1000PF-K-1KV	
C825	EEUMG2C221SC	CAP,E 220UF-160V	
C826	ECKR3A471KBP	CAP,C 470PF-K-1KV	
C827	ECA1CM102B	CAP,E 1000UF-16V	
C828	ECA160V33UE	CAP,E 33UF-160V	
C829	ECA1CM471B	CAP,E 470UF-16V	
C830	ECA1CM471B	CAP,E 470UF-16V	
C831	ECJ2VF1H103Z	CAP,C .01UF-Z-50V	
C901	TCJ2VB1H103K	CAP,C .01UF-K-50V	
C904	TACCW103T50V	CAP,C .010UF-50V	
C952	ECA1HM100B	CAP,E 10UF-50V	
C953	TACCW103T50V	CAP,C .010UF-50V	
C958	ECA2CM470E	CAP,E 47UF-160V	
C959	ECKW2H103ZF7	CAP,C .01F-Z-500V	
C960	ECCR2H151J5	CAP,C 150-500V	
C961	ECA2AM100B	CAP,E 10UF-100V	
C962	ECKW2H103ZF7	CAP,C .01F-Z-500V	
C963	ECCR1H151J5	CAP DISC 150-5-50V	
C964	ECA1CHG101B	CAP,E 100UF-16V	
C966	ECA1CHG101B	CAP,E 100UF-16V	
C967	ECA1CM221B	CAP,E 10UF-16V	
C968	TACCW103T50V	CAP,C .010UF-50V	
C969	TACCW103T50V	CAP,C .010UF-50V	
C971	TACCW222T50V	CAP, C 2200PF-50V	
C2201	ECA1HM4R7B	CAP,E 4.7UF-50V	
C2202	ECA1HM2R2B	CAP,E 2.2UF-50V	
C2203	ECA1HM4R7B	CAP,E 4.7UF-50V	
C2204	AP106K016CAE	CAP,T 10UF-16V	
C2205	ECA1HMR33B	CAP,E .33UF-50V	
C2206	ECQB1H223JF3	CAP,P .022UF-J-50V	
C2207	AP335K016CAE	CAP,T 3.3UF-16V	
C2208	ECJ2VB1C104K	CAP,C .1UF-K-16V	
C2209	ECJ2VB1C104K	CAP,C .1UF-K-16V	
C2210	ECJ2VB1C104K	CAP,C .1UF-K-16V	
C2212	ECQB1H473JF3	CAP,P .047UF-J-50V	
C2213	ECA1HMR47B	CAP,E .47UF-50V	
C2214	ECA1AM101B	CAP,E 100UF-10V	
C2215	EEANA1E100B	CAP,E 10UF-25V	
C2216	TCJ2VC1H100D	CAP,C 10PF-J-50V	
C2217	ECJ2VB1H102K	CAP,C .001UF-K-50V	
C2218	ECJ2VB1H102K	CAP,C .001UF-K-50V	
C2219	ECJ2VF1C105Z	CAP,C 1.0UF-Z-16V	
C2220	ECJ2VF1C105Z	CAP,C 1.0UF-Z-16V	
C2301	ECA1EM102E	CAP,E 1000UF-25V	
C2302	ECA1HM010B	CAP,E 1UF-50V	
C2304	ECA1CM101B	CAP,E 100UF-16V	
C2307	ECA1CM102B	CAP,E 1000UF-16V	
C2308	ECJ2VF1H103Z	CAP,C .01UF-Z-50V	
C2309	ECA1HM010B	CAP,E 1UF-50V	
C2312	ECA1HM010B	CAP,E 1UF-50V	
C2313	ECA1EM101B	CAP,E 100UF-25V	
C2317	ECA1CM102B	CAP,E 1000UF-16V	
C2319	ECA1HM010B	CAP,E 1UF-50V	
C2350	ECA1CM101B	CAP,E 100UF-16V	

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Ref. No.	Part No.	Part Name & Description	Remarks
C2351	ECA0JM221B	CAP,E 220UF-6.3V	
C2501	TCJ2VB1H332K	CAP,C .0033UF-K-50V	
C2502	TCJ2VB1H332K	CAP,C .0033UF-K-50V	
C2503	TCJ2VB1H333K	CAP,C .033UF-K-50V	
C2504	TCJ2VB1H333K	CAP,C .033UF-K-50V	
C2505	EEANA1E4R7B	CAP,E 4.7UF-25V	
C2506	EEANA1E4R7B	CAP,E 4.7UF-25V	
C2507	TCJ2VB1H472K	CAP,C 4700PF-K-50V	
C2508	TCJ2VB1H472K	CAP,C 4700PF-K-50V	
C2509	ECJ2VB1C104K	CAP,C .1UF-K-16V	
C2510	ECJ2VB1C104K	CAP,C .1UF-K-16V	
C2511	ECA1HM010B	CAP,E 1UF-50V	
C2512	ECJ2VB1C104K	CAP,C .1UF-K-16V	
C2513	ECA1HM4R7B	CAP,E 4.7UF-50V	
C2514	ECA1HM4R7B	CAP,E 4.7UF-50V	
C2515	ECJ2VF1C105Z	CAP,C 1.0UF-Z-16V	
C2516	ECA1HM4R7B	CAP,E 4.7UF-50V	
C2517	ECA1HM4R7B	CAP,E 4.7UF-50V	
C2518	ECA1HM4R7B	CAP,E 4.7UF-50V	
C2519	ECA1CM220B	CAP,E 22UF-16V	
C2520	TCJ2VF1H103Z	CAP,C .01UF-Z-50V	
C2531	ECA1HM4R7B	CAP,E 4.7UF-50V	
C2532	ECA1HM4R7B	CAP,E 4.7UF-50V	
C3001	ECA1CM220B	CAP,E 22UF-16V	
C3002	ECA1CM220B	CAP,E 22UF-16V	
C3011	ECJ2VF1C105Z	CAP,C 1.0UF-Z-16V	
C3012	ECA1HM010B	CAP,E 1UF-50V	
C3013	ECA1CM100B	CAP,E 10UF-16V	
C3014	ECA1CM100B	CAP,E 10UF-16V	
C3015	ECA1HM010B	CAP,E 1UF-50V	
C3016	ECA1HM010B	CAP,E 1UF-50V	
C3017	ECA1HM010B	CAP,E 1UF-50V	
C3018	ECA1HM010B	CAP,E 1UF-50V	
C3019	ECJ2VF1C105Z	CAP,C 1.0UF-Z-16V	
C3020	ECA1HM010B	CAP,E 1UF-50V	
C3025	ECA1HM100B	CAP,E 10UF-50V	
C3121	ECA1CM470B	CAP,E 47UF-16V	
C3122	TCJ2VF1H103Z	CAP,C .01UF-Z-50V	
C3234	ECA1CM470B	CAP,E 47UF-16V	
C3240	TCJ2VF1H103Z	CAP,C .01UF-Z-50V	
C4322	ECA1CM100B	CAP,E 10UF-16V	
C4323	ECA1CM470B	CAP,E 47UF-16V	
C4324	TCJ2VF1H103Z	CAP,C .01UF-Z-50V	
C4325	ECA1CM100B	CAP,E 10UF-16V	
C4801	TCJ2VC1H101J	CAP,C 100PF-J-50V	
C4802	ECA1HM220B	CAP,E 22UF-50V	
C4803	ECQV1H334JL3	CAP,P .33UF-J-50V	
C4804	TACCW103T50V	CAP,C .010UF-50V	
C4805	ECA1CM102B	CAP,E 1000UF-16V	
C4805	ECA1CM471B	CAP,E 470UF-16V	
C4806	ECA1CM101B	CAP,E 100UF-16V	
DIODES			
D001	MAZ30680ML	DIODE, ZENER	
D002	MA2C165001VT	DIODE	

Ref. No.	Part No.	Part Name & Description	Remarks
D003	MAZ30510HL	DIODE	
D006	MAZ33000HL	DIODE	
D007	MAZ30510HL	DIODE	
D010	MAZ40510MF	DIODE, ZENER	
D055	MAZ40330MF	DIODE, ZENER	
D358	MA2C165001VT	DIODE	
D359	MAZ40270LF	DIODE, ZENER	
D360	B0HAGP000003	DIODE	
D360	MA2C165001VT	DIODE	
D361	B0HAGP000003	DIODE	
D362	B0HAGP000003	DIODE	
D376	B0HAJP000015	DIODE	
D380	MA2C029WBF	DIODE	
D451	B0EAKL000008	DIODE, RECTIFIER	
D452	MA2C165001VT	DIODE	
D505	D1NL40V70	DIODE	
D531	MA2C165001VT	DIODE	⚠
D551	B0HAMM000072	DIODE, FAST RECOVERY	⚠
D554	AU02V0	DIODE, RECTIFIER	⚠
D556	MA2C165001VT	DIODE	
D557	MAZ40270LF	DIODE, ZENER	
D558	B0HANV000008	DIODE	
D559	EU2V1	DIODE	
D561	AU02V0	DIODE, RECTIFIER	⚠
D605	MAZ40470HF	DIODE, ZENER	
D606	MA2C165001VT	DIODE	
D753	AU01ZV0	DIODE	
D801	D3SBA60-4103	DIODE	⚠
D803	MAZ41200MF	DIODE, ZENER	
D806	TAP2AA0003	PTC 3-OHM	⚠
D808	SARS01V1	DIODE	
D809	B0HAJP000015	DIODE	
D810	B0HAJP000015	DIODE	
D811	B0HAJP000015	DIODE	
D820	MA2C165001VT	DIODE	
D821	MAZ40470HF	DIODE, ZENER	
D822	B0HAMM000103	DIODE	
D823	S3L60P154004	DIODE	⚠
D824	B0HAMM000072	DIODE, FAST RECOVERY	
D2302	MAZ43000MF	DIODE, ZENER	
D2305	CVS20B120MTA	DIODE, ZENER	
D2307	CVS20B120MTA	DIODE, ZENER	
D2350	MAZ40910LF	DIODE, ZENER	
D2353	MA2C165001VT	DIODE	
D2354	MA2C165001VT	DIODE	
D2355	MAZ30510HL	DIODE	
D2360	CVS20B120MTA	DIODE, ZENER	
D2361	CVS20B120MTA	DIODE, ZENER	
D2501	MAZ31100ML	DIODE, ZENER	
D2701	MAZ31100ML	DIODE, ZENER	
D2702	MAZ31100ML	DIODE, ZENER	
D2703	MAZ31100ML	DIODE, ZENER	
D2704	MAZ31100ML	DIODE, ZENER	

Ref. No.	Part No.	Part Name & Description	Remarks
D2705	MAZ31100ML	DIODE, ZENER	
D2706	MAZ31100ML	DIODE, ZENER	
D3001	MAZ40510MF	DIODE, ZENER	
D3004	CVS20B120MTA	DIODE, ZENER	
D3005	CVS20B120MTA	DIODE, ZENER	
D3007	CVS20B120MTA	DIODE, ZENER	
D3009	CVS20B120MTA	DIODE, ZENER	
D3011	CVS20B120MTA	DIODE, ZENER	
D3019	CVS20B120MTA	DIODE, ZENER	
D3021	CVS20B120MTA	DIODE, ZENER	
D3023	CVS20B120MTA	DIODE, ZENER	
FUSES			
F801	XBA2A00101	FUSE 6.3A 125V	
INTEGRATED CIRCUITS			
IC001	MN101E11GTD1	MPU	
IC002	TVR2AJ168S	EEPROM	
IC004	PST9128NR	RESET	
IC005	PQ3RD13	3.3V STBY REGULATOR	
IC351	C1AA00000622	RGB AMPLIFIER	
IC451	AN15525A	VERTICAL OUTPUT	
IC501	NC7SZU04M5X	HORIZONTAL INVERTER	
IC551	AN78M09LB	9V REGULATOR	
IC552	AN78M05LB	5V REGULATOR	
IC801	STRW5634	POWER SUPPLY	
IC802	PC123X2YFZ	OPTO-COUPLER	
IC2201	AN5829S-E1V	MTS AUDIO	
IC2301	AN17807A	AUDIO AMPLIFIER	
IC2501	NJW1164MTE1	BBE AUDIO PROCESSOR	
IC3001	MM1114XFBE	VIDEO SWITCH	
IC3002	MM1501XNRE	FRONT VIDEO INPUT SWITCH	
IC3101	74HC4066D653	AUDIO INPUT SWITCH	
IC4801	AN15530B	TILT CORRECTION	
COILS			
L002	EXCELSA39V	EMI BEAD CORE	
L005	EXCELSA35T	FERRITE BEAD	
L006	EXCELSA35T	FERRITE BEAD	
L007	ELESN330JA	COIL, 33UH	
L008	G0C470KA0029	COIL, PEAKING 47UH	
L010	G0C2R2KA0029	COIL, PEAKING 2.2UH	
L011	EXCELSA26T	FERRITE BEAD	
L012	G0C2R2KA0029	COIL, PEAKING 2.2UH	
L014	ELESN180KA	COIL, PEAKING 18UH	
L015	ELESN3R3JA	COIL, PEAKING 3.3UH	
L020	EXCELSA26T	FERRITE BEAD	
L045	EXCELSA35T	FERRITE BEAD	
L108	EXCELSA35T	FERRITE BEAD	
L110	G0C101KA0021	COIL, PEAKING 100UH	
L148	EXCELSA24T	FERRITE BEAD	
L245	EXCELSA35T	FERRITE BEAD	
L312	EXCELSA24T	FERRITE BEAD	
L551	ELH5L7115	COIL, HORIZONTAL LINEARTY	
L552	EXCELSA39V	EMI BEAD CORE	
L558	ELC10D471E	CHOKO COIL	

Ref. No.	Part No.	Part Name & Description	Remarks
L751	ELC18B501E	COIL	⚠
L752	ELC18B103E	COIL	
L753	EXCELSA35T	FERRITE BEAD	
L755	EXCELSA39V	EMI BEAD CORE	
L756	EXCELSA39V	EMI BEAD CORE	
L801	ELF21V020A	LINE FILTER	⚠
L802	TALL08T470KA	COIL	
L803	TALL08T680KA	COIL	
L804	EXCELD35V	FERRITE BEAD	
L805	EXCELD35V	FERRITE BEAD	
L806	EXCELD35V	FERRITE BEAD	
L807	EXCELSA35T	FERRITE BEAD	
L808	EXCELSA35T	FERRITE BEAD	
L809	EXCELD35V	FERRITE BEAD	
L810	EXCELD35V	FERRITE BEAD	
L829	EXCELD27V	FERRITE BEAD	
L951	EXCELSA24T	FERRITE BEAD	
L953	EXCELSA24T	FERRITE BEAD	
L954	EXCELSA24T	FERRITE BEAD	
L955	EXCELSA24T	FERRITE BEAD	
L2301	EXCELSA35T	FERRITE BEAD	
L2303	EXCELSA39V	EMI BEAD CORE	
L2305	EXCELSA35T	FERRITE BEAD	
TRANSISTORS			
Q001	2PD601AR-115	TRANSISTOR	
Q057	2PB709AR-115	TRANSISTOR	
Q058	2PB709AR-115	TRANSISTOR	
Q070	2PD601AR-115	TRANSISTOR	
Q092	2PB709AR-115	TRANSISTOR	
Q354	2PD601AR-115	TRANSISTOR	
Q355	2PD601AR-115	TRANSISTOR	
Q356	2PD601AR-115	TRANSISTOR	
Q357	2PD601AR-115	TRANSISTOR	
Q358	2PD601AR-115	TRANSISTOR	
Q359	2PD601AR-115	TRANSISTOR	
Q360	2PB709AR-115	TRANSISTOR	
Q361	2PB709AR-115	TRANSISTOR	
Q362	2PB709AR-115	TRANSISTOR	
Q411	2SB0710AQL	TRANSISTOR	
Q412	2SD0602AQL	TRANSISTOR	
Q451	2PB709AR-115	TRANSISTOR	
Q501	2SC4212HLB	TRANSISTOR	
Q551	2SC5902000LK	TRANSISTOR	⚠
Q560	2PB709AR-115	TRANSISTOR	
Q605	2PB709AR-115	TRANSISTOR	
Q606	2PD601AR-115	TRANSISTOR	
Q751	B1DACM000001	TRANSISTOR	
Q757	2SC1685QRSTA	TRANSISTOR	
Q801	2PD601AR-115	TRANSISTOR	
Q802	2PD601AR-115	TRANSISTOR	
Q820	2SA1767QTA	TRANSISTOR	
Q830	2SB1011QRL	TRANSISTOR	
Q831	2SC1473ATA	TRANSISTOR	

Ref. No.	Part No.	Part Name & Description	Remarks
Q901	2PD601AR-115	TRANSISTOR	
Q902	2PB709AR-115	TRANSISTOR	
Q951	2SC3311ATA	TRANSISTOR	
Q952	2SC3311ATA	TRANSISTOR	
Q953	2SC1741ASTP	TRANSISTOR	
Q954	2SB1030ATA	TRANSISTOR	
Q955	2SA214000SLB	TRANSISTOR	
Q956	2SC599300SLB	TRANSISTOR	
Q957	2SA1309ATA	TRANSISTOR	
Q958	2SC3311ATA	TRANSISTOR	
Q961	2SC3311ATA	TRANSISTOR	
Q962	2SC3311ATA	TRANSISTOR	
Q2350	2PB709AR-115	TRANSISTOR	
Q2351	2PD601AR-115	TRANSISTOR	
Q2352	2PB709AR-115	TRANSISTOR	
Q2361	2PD601AR-115	TRANSISTOR	
Q2362	2PD601AR-115	TRANSISTOR	
Q2363	2PB709AR-115	TRANSISTOR	
Q3001	2PD601AR-115	TRANSISTOR	
Q3002	2PD601AR-115	TRANSISTOR	
Q3193	2PD601AR-115	TRANSISTOR	
Q3194	2PD601AR-115	TRANSISTOR	
Q4801	2PD601AR-115	TRANSISTOR	
RELAYS			
RL801	K6B1AGA00042	RELAY	
RESISTORS			
R001	ERJ6GEYJ103V	RES,M 10K-J-1/10W	
R004	ERJ6GEYJ562V	RES,M 5.6K-J-1/10W	
R005	ERJ6GEYJ471V	RES,M 470-J-1/10W	
R007	ERJ6GEYJ471V	RES,M 470-J-1/10W	
R008	ERJ6GEYJ223V	RES,M 22K-J-1/10W	
R009	ERJ6GEYJ102V	RES,M 1K-J-1/10W	
R014	ERJ6GEYJ472V	RES,M 4.7K-J-1/10W	
R015	ERJ6GEYJ472V	RES,M 4.7K-J-1/10W	
R016	ERJ6GEYJ221V	RES,M 220-J-1/10W	
R017	ERJ6GEYJ221V	RES,M 220-J-1/10W	
R020	ERJ6GEYJ221V	RES,M 220-J-1/10W	
R021	ERJ6GEYJ101V	RES,M 100-J-1/10W	
R022	ERJ6GEYJ101V	RES,M 100-J-1/10W	
R023	ERJ6GEYJ102V	RES,M 1K-J-1/10W	
R024	ERJ6GEYJ101V	RES,M 100-J-1/10W	
R025	ERJ6GEYJ101V	RES,M 100-J-1/10W	
R026	ERDS1FJ561P	RES,C 560-J-1/2W	
R032	ERJ6GEYJ103V	RES,M 10K-J-1/10W	
R039	ERDS2TJ102T	RES,C 1K-J-1/4W	
R040	ERJ6GEYJ680V	RES,M 68-J-1/10W	
R041	ERJ6GEYJ222V	RES,M 2.2K-J-1/10W	
R042	ERJ6GEYJ222V	RES,M 2.2K-J-1/10W	
R043	ERJ6GEYJ153V	RES,M 15K-J-1/10W	
R044	ERJ6GEYJ101V	RES,M 100-J-1/10W	
R045	ERDS2TJ101T	RES,C 100-J-1/4W	
R046	ERJ6GEYJ102V	RES,M 1K-J-1/10W	
R047	ERJ6GEYJ472V	RES,M 4.7K-J-1/10W	
R048	ERJ6GEYJ101V	RES,M 100-J-1/10W	

Ref. No.	Part No.	Part Name & Description	Remarks
R050	ERJ6GEYJ102V	RES,M 1K-J-1/10W	
R052	ERJ6GEYJ103V	RES,M 10K-J-1/10W	
R053	ERJ6GEYJ101V	RES,M 100-J-1/10W	
R055	ERJ6GEYJ103V	RES,M 10K-J-1/10W	
R056	ERJ6GEYJ471V	RES,M 470-J-1/10W	
R059	ERJ6GEYJ121V	RES,M 120-J-1/10W	
R061	ERJ6GEYJ221V	RES,M 220-J-1/10W	
R062	ERJ6GEYJ472V	RES,M 4.7K-J-1/10W	
R064	ERJ6GEYJ473V	RES,M 47K-J-1/10W	
R065	ERDS2TJ101T	RES,C 100-J-1/4W	
R066	ERJ6GEYJ223V	RES,M 22K-J-1/10W	
R067	ERJ6GEYJ223V	RES,M 22K-J-1/10W	
R068	ERJ6GEYJ103V	RES,M 10K-J-1/10W	
R069	ERJ6GEYJ123V	RES,M 12K-J-1/10W	
R070	ERJ6GEYJ561V	RES,M 560-J-1/10W	
R071	ERJ6GEYJ680V	RES,M 68-J-1/10W	
R072	ERJ6GEYJ222V	RES,M 2.2K-J-1/10W	
R073	ERJ6GEYJ471V	RES,M 470-J-1/10W	
R074	ERJ6GEYJ471V	RES,M 470-J-1/10W	
R075	ERJ6ENF3902V	RES,M 39K-F-1/10W	
R076	ERJ6ENF6201V	RES,M 6.2K-F-1/10W	
R078	ERJ6GEYJ103V	RES,M 10K-J-1/10W	
R080	ERJ6GEYJ183V	RES,M 18K-J-1/10W	
R081	ERJ6GEYJ153V	RES,M 15K-J-1/10W	
R082	ERJ6GEYJ183V	RES,M 18K-J-1/10W	
R083	ERJ6GEYJ153V	RES,M 15K-J-1/10W	
R084	ERDS2TJ182T	RES,C 1.8K-J-1/4W	
R087	ERDS2TJ221T	RES,C 220-J-1/4W	
R088	ERJ6GEYJ223V	RES,M 22K-J-1/10W	
R092	ERJ6GEYJ473V	RES,M 47K-J-1/10W	
R093	ERJ6GEYJ331V	RES,M 330-J-1/10W	
R202	ERJ6GEYJ222V	RES,M 2.2K-J-1/10W	
R351	ER0S2THF1201	RES,M 1.2K-F-1/4W	
R352	ER0S2THF1201	RES,M 1.2K-F-1/4W	
R353	ER0S2THF1201	RES,M 1.2K-F-1/4W	
R354	ERDS2TJ102T	RES,C 1K-J-1/4W	
R355	ERDS2TJ102T	RES,C 1K-J-1/4W	
R356	ERDS2TJ102T	RES,C 1K-J-1/4W	
R357	ERDS2TJ102T	RES,C 1K-J-1/4W	
R358	ERDS1TJ104T	RES,C 100K-J-1/2W	
R359	ERDS1TJ104T	RES,C 100K-J-1/2W	
R360	ERDS1TJ104T	RES,C 100K-J-1/2W	
R361	EROS2THF5601	RES,M 5.6K-F-1/4W	
R362	EROS2THF2001	RES,M 2K-F-1/4W	
R363	ERC12GK102D	RES,C 1K-K-1/2W	
R364	ERC12GK102D	RES,C 1K-K-1/2W	
R365	ERC12GK102D	RES,C 1K-K-1/2W	
R367	ERDS2TJ105T	RES,C 1M-J-1/4W	
R371	ERDS2TJ102T	RES,C 1K-J-1/4W	
R371	ERJ6GEYJ101V	RES,M 100-J-1/10W	
R372	ERDS2TJ102T	RES,C 1K-J-1/4W	
R372	ERJ6GEYJ101V	RES,M 100-J-1/10W	
R373	ERJ6GEYJ101V	RES,M 100-J-1/10W	
R374	ERJ6GEYJ102V	RES,M 1K-J-1/10W	

Ref. No.	Part No.	Part Name & Description	Remarks
R374	ERQ12AJ121P	RES,F 120-J-1/2W	
R375	ERJ6GEYJ102V	RES,M 1K-J-1/10W	
R376	ERJ6GEYJ102V	RES,M 1K-J-1/10W	
R377	ERJ6ENF3300V	RES,M 330-F-1/10W	
R378	ERJ6ENF3300V	RES,M 330-F-1/10W	
R379	ERJ6ENF3300V	RES,M 330-F-1/10W	
R380	ERJ6ENF1501V	RES,M 1.5K-F-1/10W	
R381	ERJ6ENF1501V	RES,M 1.5K-F-1/10W	
R382	ERJ6ENF1501V	RES,M 1.5K-F-1/10W	
R383	ERJ6ENF3481V	RES,M 3.48K-F-1/10W	
R384	ERJ6ENF7500V	RES,M 750-F-1/10W	
R385	ERDS1FJ150P	RES,C 15-J-1/2W	
R389	ERJ6GEYJ102V	RES,M 1K-J-1/10W	
R390	ERJ6GEYJ102V	RES,M 1K-J-1/10W	
R391	ERJ6GEYJ102V	RES,M 1K-J-1/10W	
R411	ERJ6GEYJ682V	RES,M 6.8K-J-1/10W	
R412	ERJ6GEYJ471V	RES,M 470-J-1/10W	
R413	ERJ6GEYJ103V	RES,M 10K-J-1/10W	
R414	ERJ6GEYJ471V	RES,M 470-J-1/10W	
R451	ERDS1FJ1R0P	RES,C 1.0-J-1/2W	
R452	ERDS1FJ3R3P	RES,C 3.3-J-1/2W	
R453	ERJ6GEYJ563V	RES,M 56K-J-1/10W	
R454	ERJ6GEYJ683V	RES,M 68K-J-1/10W	
R455	ERJ6GEYJ103V	RES,M 10K-J-1/10W	
R455	ERJ6GEYJ752V	RES,M 7.5K-J-1/10W	
R456	ERG3FJ151	RES,M 150-J-3W	
R457	ERDS1FJ1R0P	RES,C 1.0-J-1/2W	
R458	ERJ6GEYJ123V	RES,M 12K-J-1/10W	
R459	ERJ6GEYJ152V	RES,M 1.5K-J-1/10W	
R461	ERJ6GEYJ331V	RES,M 330-J-1/10W	
R462	ERJ6GEYJ272V	RES,M 2.7K-J-1/10W	
R463	ERJ6GEYJ473V	RES,M 47K-J-1/10W	
R464	ERJ6GEYJ103V	RES,M 10K-J-1/10W	
R465	ERJ6GEYJ122V	RES,M 1.2K-J-1/10W	
R468	ERJ6ENF1962V	RES,M 19.6K-F-1/10W	
R469	ERJ6ENF3901V	RES,M 3.9K-F-1/10W	
R471	ERJ6GEYJ223V	RES,M 22K-J-1/10W	
R504	ERDS2TJ102T	RES,C 1K-J-1/4W	
R505	ERJ6GEYJ562V	RES,M 5.6K-J-1/10W	
R506	ERG1SJ562P	RES,M 5.6K-J-1W	
R507	EROS2THF1802	RES,M 18K-F-1/4W	
R509	ERJ6ENF1002V	RES,M 10K-F-1/10W	
R510	ERG3FJ362	RES,M 3.6K-F-3W	
R512	ERJ6GEYJ222V	RES,M 2.2K-J-1/10W	
R514	ERJ6GEYJ392V	RES,M 3.9K-J-1/10W	
R515	ERJ6GEYJ101V	RES,M 100-J-1/10W	
R520	ERJ6GEYJ471V	RES,M 470-J-1/10W	
R532	ERJ6ENF2202V	RES,M 22K-F-1/10W	
R533	ERJ6ENF1003V	RES,M 100K-F-1/10W	
R539	ERDS2TJ105T	RES,C 1M-J-1/4W	
R541	ERDS2TJ274T	RES,C 27K-J-1/4W	
R542	ERJ6GEYJ124V	RES,M 120K-J-1/10W	
R547	ERQ1CJP2R2S	RES,F 2.2-J-1W	

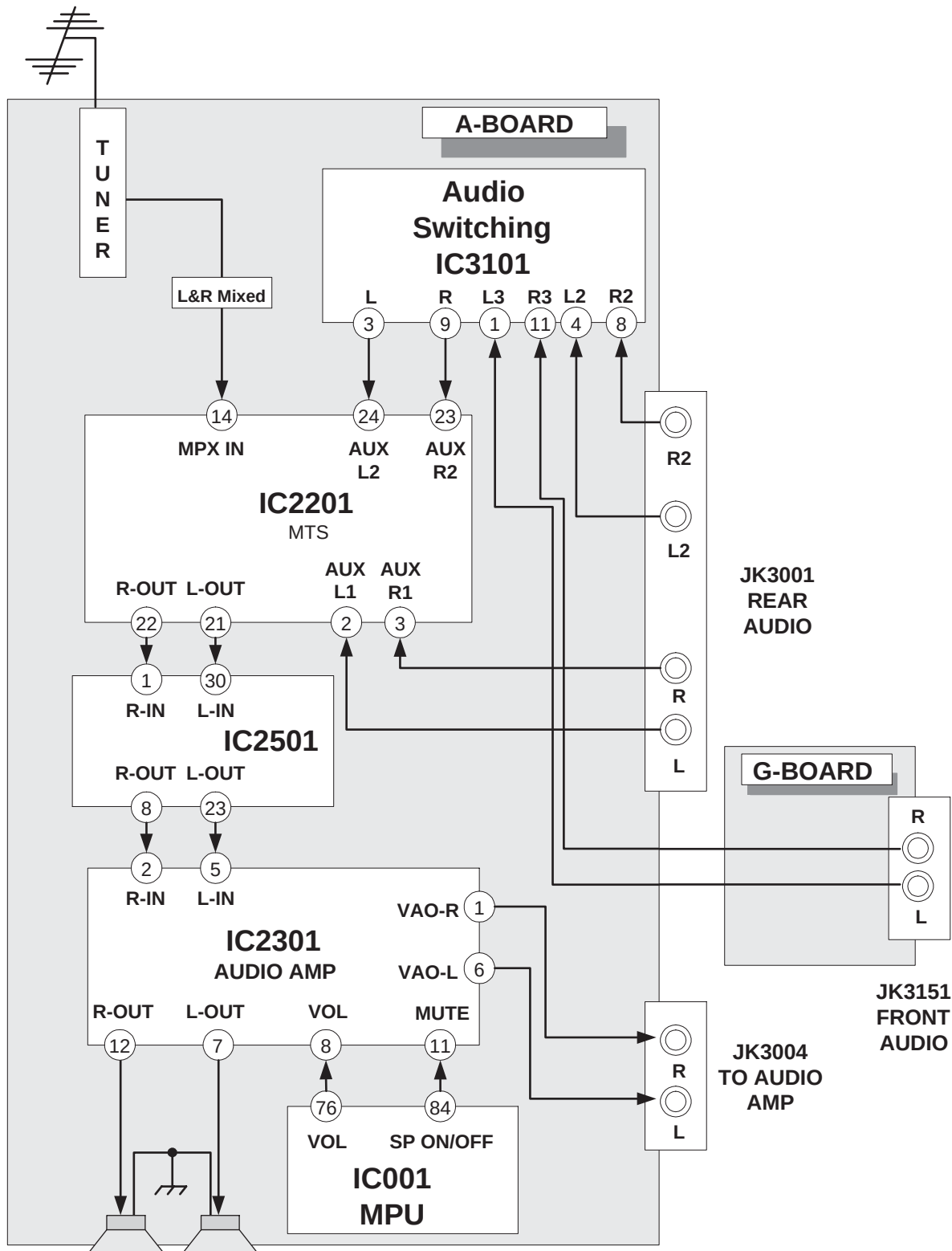
Ref. No.	Part No.	Part Name & Description	Remarks
R551	ERX12SJR47P	RES,M .47-J-1/2W	
R552	ERDS1FJ1R0T	RES,C 1.0-J-1/2W	
R554	ERG1SJ470P	RES,M 47-J-1W	
R557	ERDS2TJ223T	RES,C 22K-J-1/4W	
R558	ERDS2TJ223T	RES,C 22K-J-1/4W	
R559	ERG2FJ683H	RES,M 68K-J-2W	
R561	ERG2FJ102H	RES,M 1K-J-2W	
R562	ERG2FJ270H	RES,M 27-J-2W	
R563	ERG3FJ150H	RES,M 15-J-3W	
R564	ERDS2TJ563T	RES,C 56K-J-1/4W	
R565	ERDS2TJ683T	RES,C 68K-J-1/4W	
R592	ERJ6GEYJ472V	RES,M 4.7K-J-1/10W	
R605	ERDS2TJ103T	RES,C 10K-J-1/4W	
R606	ERJ6GEYJ562V	RES,M 5.6K-J-1/10W	
R607	ERJ6GEYJ102V	RES,M 1K-J-1/10W	
R608	ERJ6GEYJ104V	RES,M 100K-J-1/10W	
R713	ERDS2TJ123T	RES,C 12K-J-1/4W	
R716	ERDS2TJ101T	RES,C 100-J-1/4W	
R756	ERG2FJ820H	RES,M 82-J-2W	
R761	ERDS2TJ102T	RES,C 1K-J-1/4W	
R762	ERDS2TJ472T	RES,C 4.7K-J-1/4W	
R802	ERG2FJ104H	RES,M 100K-J-2W	
R804	ERG1DJ224P	RES,M 220K-P-1W	
R805	ERX2FZJR15H	RES,M .18-J-2W	
R806	ERX12SJ1R5P	RES,M 1.5-J-1/2W	
R807	ERDS2TJ681T	RES,C 680-J-1/4W	
R808	ERX12SJ1R5P	RES,M 1.5-J-1/2W	
R809	ERDS2TJ472T	RES,C 4.7K-J-1/4W	
R810	ERDS2TJ221T	RES,C 220-J-1/4W	
R815	ERC12ZGK825D	RES,C 8.2MEG-K-1/2W	
R821	ERDS1FJ1R0T	RES,C 1.0-J-1/2W	
R822	ERDS1FJ1R0T	RES,C 1.0-J-1/2W	
R823	ERDS1FJ272T	RES,C 2.7K-J-1/2W	
R824	ERDS2TJ223T	RES,C 22K-J-1/4W	
R825	ERDS2TJ272T	RES,C 2.7K-J-1/4W	
R827	ERJ6GEYJ153V	RES,M 15K-J-1/10W	
R828	ERJ6GEYJ104V	RES,M 100K-J-1/10W	
R829	ERJ6GEYJ104V	RES,M 100K-J-1/10W	
R830	ERG3FJ183	RES,M 18K-J-3W	
R831	ERDS2TJ682T	RES,C 6.8K-J-1/4W	
R832	ERJ6GEYJ272V	RES,M 2.7K-J-1/10W	
R833	ERJ6GEYJ473V	RES,M 47K-J-1/10W	
R834	ERJ6GEYJ472V	RES,M 4.7K-J-1/10W	
R837	ERJ6GEYJ103V	RES,M 10K-J-1/10W	
R838	ERJ6GEYJ103V	RES,M 10K-J-1/10W	
R851	ERQ12HJR56P	RES,F .56-J-1/2W	
R902	ERJ6GEYJ392V	RES,M 3.9K-J-1/10W	
R903	ERJ6GEYJ561V	RES,M 560-J-1/10W	
R905	ERJ6GEYJ102V	RES,M 1K-J-1/10W	
R906	ERJ6GEYJ102V	RES,M 1K-J-1/10W	
R908	ERJ6GEYJ683V	RES,M 68K-J-1/10W	
R909	ERJ6GEYJ103V	RES,M 10K-J-1/10W	
R951	ERDS2TJ821T	RES,C 820-J-1/4W	

Ref. No.	Part No.	Part Name & Description	Remarks
R952	ERDS2TJ153T	RES,C 15K-J-1/4W	
R953	ERDS2TJ332T	RES,C 3.3K-J-1/4W	
R954	ERDS2TJ431T	RES,C 430-J-1/4W	
R956	ERDS2TJ121T	RES,C 120-J-1/4W	
R958	ERDS2TJ391T	RES,C 390-J-1/4W	
R959	ERDS2TJ101T	RES,C 100-J-1/4W	
R960	ERQ14AJ100E	RES,F 10-J-1/4W	
R961	ERQ1CJP331S	RES,F 330-J-1W	
R962	ERDS2TJ330T	RES,C 33-J-1/4W	
R963	ERDS2TJ330T	RES,C 33-J-1/4W	
R964	ERDS2TJ471T	RES,C 470-J-1/4W	
R965	ERDS2TJ563T	RES,C 56K-J-1/4W	
R966	ERDS1FVJ471T	RES,C 470-J-1/4W	
R967	ERDS2TJ563T	RES,C 56K-J-1/4W	
R968	ERDS2TJ471T	RES,C 470-J-1/4W	
R969	ERDS2TJ390T	RES,C 39-J-1/2W	
R970	ERDS2TJ2R2T	RES,C 2.2-J-1/4W	
R971	ERDS2TJ2R2T	RES,C 2.2-J-1/4W	
R972	ERDS2TJ390T	RES,C 39-J-1/2W	
R973	ERDS2TJ101T	RES,C 100-J-1/4W	
R974	ERDS2TJ333T	RES,C 33K-J-1/4W	
R975	ERDS2TJ101T	RES,C 100-J-1/4W	
R976	ERDS2TJ101T	RES,C 100-J-1/4W	
R977	ERDS2TJ561T	RES,C 560-J-1/4W	
R978	ERDS2TJ101T	RES,C 100-J-1/4W	
R987	ERDS2TJ472T	RES,C 4.7K-J-1/4W	
R988	ERDS2TJ331T	RES,C 330-J-1/4W	
R989	ERDS2TJ682T	RES,C 6.8K-J-1/4W	
R990	ERDS2TJ471T	RES,C 470-J-1/4W	
R993	ERDS2TJ471T	RES,C 470-J-1/4W	
R2201	ERJ6GEYJ224V	RES,M 220K-J-1/10W	
R2203	ERJ6GEYJ102V	RES,M 1K-J-1/10W	
R2204	ERJ6GEYJ102V	RES,M 1K-J-1/10W	
R2205	ERDS2TJ101T	RES,C 100-J-1/4W	
R2206	ERDS2TJ273T	RES,C 27K-J-1/4W	
R2307	ERDS2TJ222T	RES,C 2.2K-J-1/4W	
R2320	ERJ6GEYJ103V	RES,M 10K-J-1/10W	
R2351	ERJ6GEYJ751V	RES,M 750-J-1/10W	
R2352	ERJ6GEYJ152V	RES,M 1.5K-J-1/10W	
R2356	ERJ6GEYJ101V	RES,M 100-J-1/10W	
R2357	ERJ6GEYJ472V	RES,M 4.7K-J-1/10W	
R2360	ERJ6GEYJ271V	RES,M 270-J-1/10W	
R2361	ERJ6GEYJ221V	RES,M 220-J-1/10W	
R2362	ERJ6GEYJ221V	RES,M 220-J-1/10W	
R2363	ERJ6GEYJ332V	RES,M 3.3K-J-1/10W	
R2364	ERJ6ENF1001V	RES,M 1K-F-1/10W	
R2365	ERJ6ENF8200V	RES,M 820-F-1/10W	
R2366	ERJ6GEYJ331V	RES,M 330-J-1/10W	
R2367	ERJ6GEYJ102V	RES,M 1K-J-1/10W	
R2368	ERJ6GEYJ102V	RES,M 1K-J-1/10W	
R2369	ERJ6GEYJ271V	RES,M 270-J-1/10W	
R2370	ERJ6GEYJ222V	RES,M 2.2K-J-1/10W	
R2371	ERJ6GEYJ104V	RES,M 100K-J-1/10W	
R2372	ERJ6GEYJ102V	RES,M 1K-J-1/10W	

Ref. No.	Part No.	Part Name & Description	Remarks
R2373	ERJ6GEYJ562V	RES,M 5.6K-J-1/10W	
R2374	ERDS2TJ682T	RES,C 6.8K-J-1/4W	
R2417	ERJ6GEYJ103V	RES,M 10K-J-1/10W	
R2504	ERDS2TJ101T	RES,C 100-J-1/4W	
R2505	ERDS2TJ101T	RES,C 100-J-1/4W	
R2701	ERDS2TJ750T	RES,C 75-J-1/4W	
R2702	ERDS2TJ222T	RES,C 2.2K-J-1/4W	
R2703	ERDS2TJ222T	RES,C 2.2K-J-1/4W	
R2704	ERDS2TJ332T	RES,C 3.3K-J-1/4W	
R2705	ERDS2TJ512T	RES,C 5.1K-J-1/4W	
R2706	ERDS2TJ912T	RES,C 9.1K-J-1/4W	
R2707	ERDS2TJ223T	RES,C 22K-J-1/4W	
R3001	ERDS2TJ101T	RES,C 100-J-1/4W	
R3002	ERJ6GEYJ221V	RES,M 220-J-1/10W	
R3003	ERJ6GEYJ221V	RES,M 220-J-1/10W	
R3005	ERJ6GEYJ334V	RES,M 330K-J-1/10W	
R3006	ERJ6ENF75R0V	RES,M 75.0-F-1/10W	
R3008	ERJ6ENF75R0V	RES,M 75.0-F-1/10W	
R3010	ERJ6GEYJ334V	RES,M 330K-J-1/10W	
R3013	ERJ6ENF75R0V	RES,M 75.0-F-1/10W	
R3015	ERJ6ENF75R0V	RES,M 75.0-F-1/10W	
R3018	ERDS2TJ101T	RES,C 100-J-1/4W	
R3021	ERDS2TJ101T	RES,C 100-J-1/4W	
R3022	ERDS2TJ101T	RES,C 100-J-1/4W	
R3023	ERDS2TJ101T	RES,C 100-J-1/4W	
R3024	ERDS2TJ101T	RES,C 100-J-1/4W	
R3025	ERDS2TJ101T	RES,C 100-J-1/4W	
R3026	ERDS2TJ101T	RES,C 100-J-1/4W	
R3027	ERDS2TJ101T	RES,C 100-J-1/4W	
R3028	ERJ6ENF75R0V	RES,M 75.0-F-1/10W	
R3029	ERJ6GEYJ101V	RES,M 100-J-1/10W	
R3030	ERJ6GEYJ223V	RES,M 22K-J-1/10W	
R3031	ERJ6GEYJ223V	RES,M 22K-J-1/10W	
R3032	ERJ6GEYJ223V	RES,M 22K-J-1/10W	
R3033	ERJ6GEYJ223V	RES,M 22K-J-1/10W	
R3034	ERJ6GEYJ471V	RES,M 470-J-1/10W	
R3035	ERJ6GEYJ562V	RES,M 5.6K-J-1/10W	
R3036	ERJ6GEYJ183V	RES,M 18K-J-1/10W	
R3037	ERJ6GEYJ471V	RES,M 470-J-1/10W	
R3038	ERJ6GEYJ562V	RES,M 5.6K-J-1/10W	
R3039	ERJ6GEYJ183V	RES,M 18K-J-1/10W	
R3041	ERJ6GEYJ472V	RES,M 4.7K-J-1/10W	
R3042	ERJ6GEYJ472V	RES,M 4.7K-J-1/10W	
R3101	ERJ6GEYJ334V	RES,M 330K-J-1/10W	
R3102	ERJ6GEYJ334V	RES,M 330K-J-1/10W	
R3103	ERJ6GEYJ334V	RES,M 330K-J-1/10W	
R3104	ERJ6GEYJ334V	RES,M 330K-J-1/10W	
R3131	ERJ6GEYJ223V	RES,M 22K-J-1/10W	
R3132	ERJ6GEYJ223V	RES,M 22K-J-1/10W	
R3133	ERJ6GEYJ153V	RES,M 15K-J-1/10W	
R3134	ERJ6GEYJ333V	RES,M 33K-J-1/10W	
R3135	ERJ6GEYJ154V	RES,M 150K-J-1/10W	
R4801	ERJ6GEYJ103V	RES,M 10K-J-1/10W	
R4802	ERJ6GEYJ103V	RES,M 10K-J-1/10W	

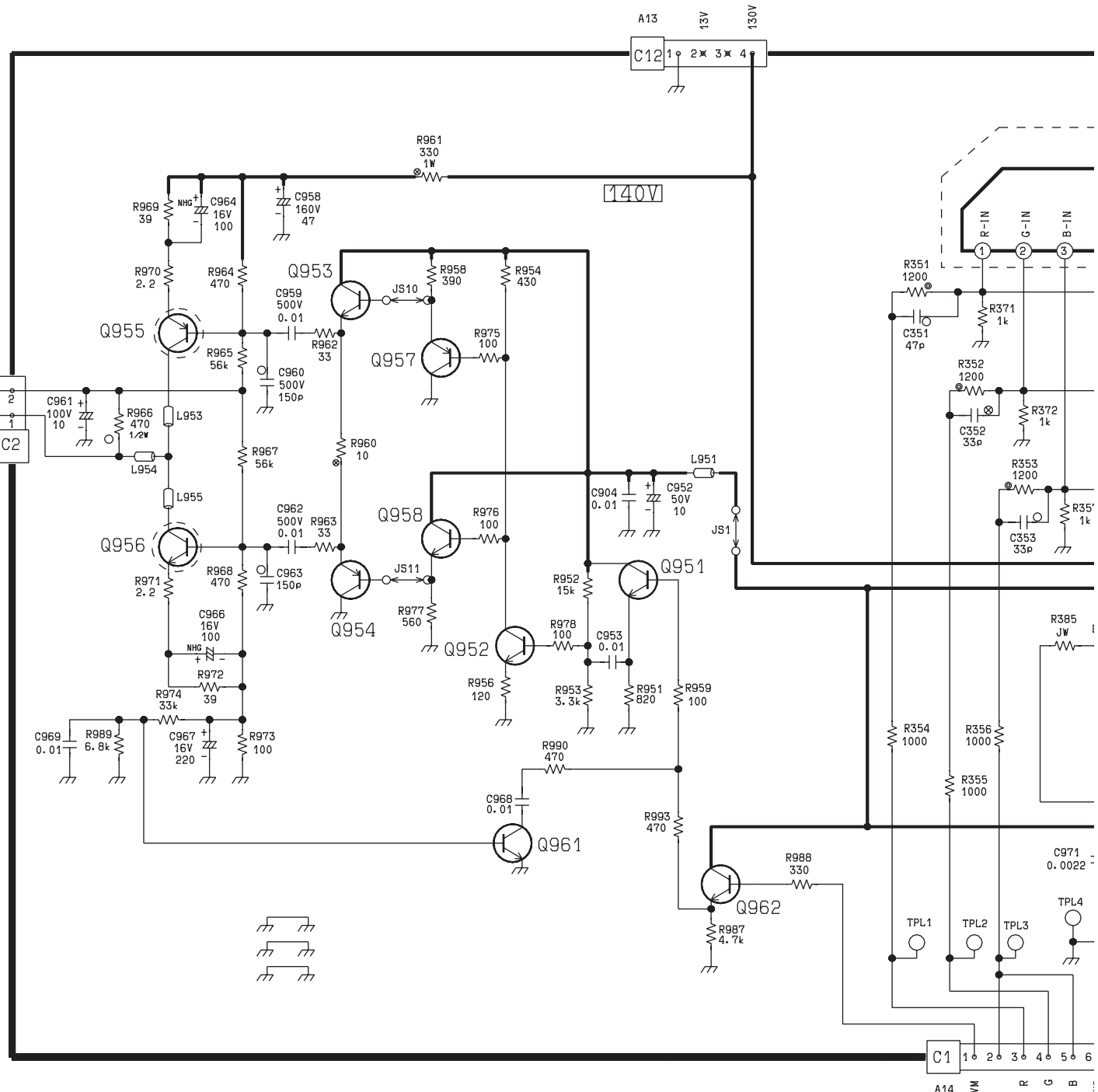
Ref. No.	Part No.	Part Name & Description	Remarks
R4803	ERJ6GEYJ472V	RES,M 4.7K-J-1/10W	
R4804	ERJ6GEYJ562V	RES,M 5.6K-J-1/10W	
R4805	ERJ6GEYJ562V	RES,M 5.6K-J-1/10W	
R4806	ERG1SJ100P	RES,M 10-J-1W	
R4807	ERDS2TJ100T	RES,C 10-J-1/4W	
R4817	ERJ6GEYJ473V	RES,M 47K-J-1/10W	
R4818	ERJ6GEYJ563V	RES,M 56K-J-1/10W	
SWITCHES			
S001	TSE2AD002	SWITCH (POWER)	
S002	EVQPBD05R	SWITCH	
S003	EVQPBD05R	SWITCH	
S004	EVQPBD05R	SWITCH	
S005	EVQPBD05R	SWITCH	
S006	EVQPBD05R	SWITCH	
S007	EVQPBD05R	SWITCH	
TRANSFORMERS			
T501	ETH19Y211AZ	TRANSFORMER	
T551	TLF2AA008	FLYBACK WITH ANODE LEAD	
T801	ETS35AA6B5NC	TRANSFORMER	
T3001	TF0402B04P03	TRANSFORMER	
CRYSTALS / FILTERS			
X001	A1100005BD	CRYSTAL F/ELECTRONIC USE	
OTHERS			
TNR001	ENG36A10GF	TUNER	
<u>1</u>	A68QCP693X	CRT	
M001	TJS2AC00401	CRT SOCKET	
<u>2</u>	TLY2AA038	DEFLECTION YOKE	
<u>3</u>	TXF3A01ZERA	DAG GND	
<u>4</u>	TSP2AA026-1	DEGAUSSING COIL	
M002	TSP2AF005	GEOMAGNETIC COIL	
<u>5</u>	TP-13000PX5	CONVERGENCE & PURITY RINGS	
M003	0FMK014ZZ	PERMALLOY MAGNET	
<u>6</u>	TAS2AA0023	SPEAKER 8 OHM	
M004	TXFKP24GSER	SPEAKER BRACKET	
<u>7</u>	TXFBX01JSER	POWER BUTTON	
<u>8</u>	TKPA34401S	FRONT DOOR	
<u>9</u>	TEK6940	DOOR LATCH	
<u>10</u>	TKPA34502	IR GUIDE	
M005	TMM2A30702	YOKE WEDGE	
M006	TSN63115-4	PURITY MAGNET	
M007	TSX2AA0361	AC LINE CORD	
<u>11</u>	TXFKY01EY4S	FRONT CABINET	
<u>12</u>	TXFKU01JSER	BACK CABINET	
JK3001	TJB2AA0221	8 PIN A/V JACK	
JK3003	TJB2AA0421	S-VIDEO JACK	
JK3004	TJB2AA0211-1	2 PIN A/V JACK	
JK3151	TJB2AA0501	A/V OUTPUT JACK	
OTHER ACCESSORIES			
M008	EUR7613ZB0	REMOTE CONTROL	
M009	UR76EC0303E	BATTERY COVER (REMOTE CTRL)	
M010	TQB2AA0499	OWNER'S MANUAL	

Audio signal path block diagram



CT-27SL14J/UJ MODELS

J
I
H
G
F
E
D
C
B
A



J

I

H

G

F

E

D

C

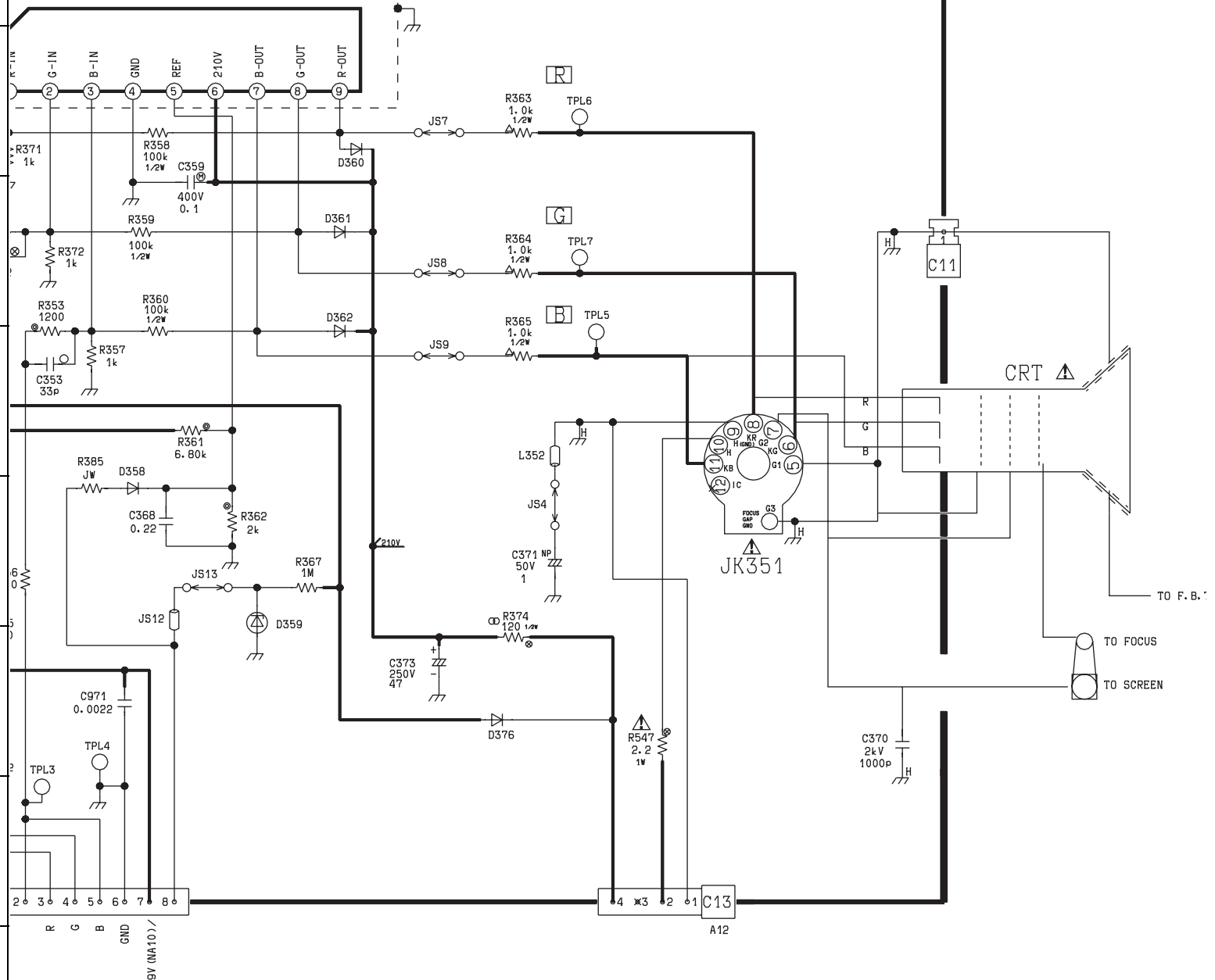
B

A

TNP2AA157AP

C

IC351



1

2

3

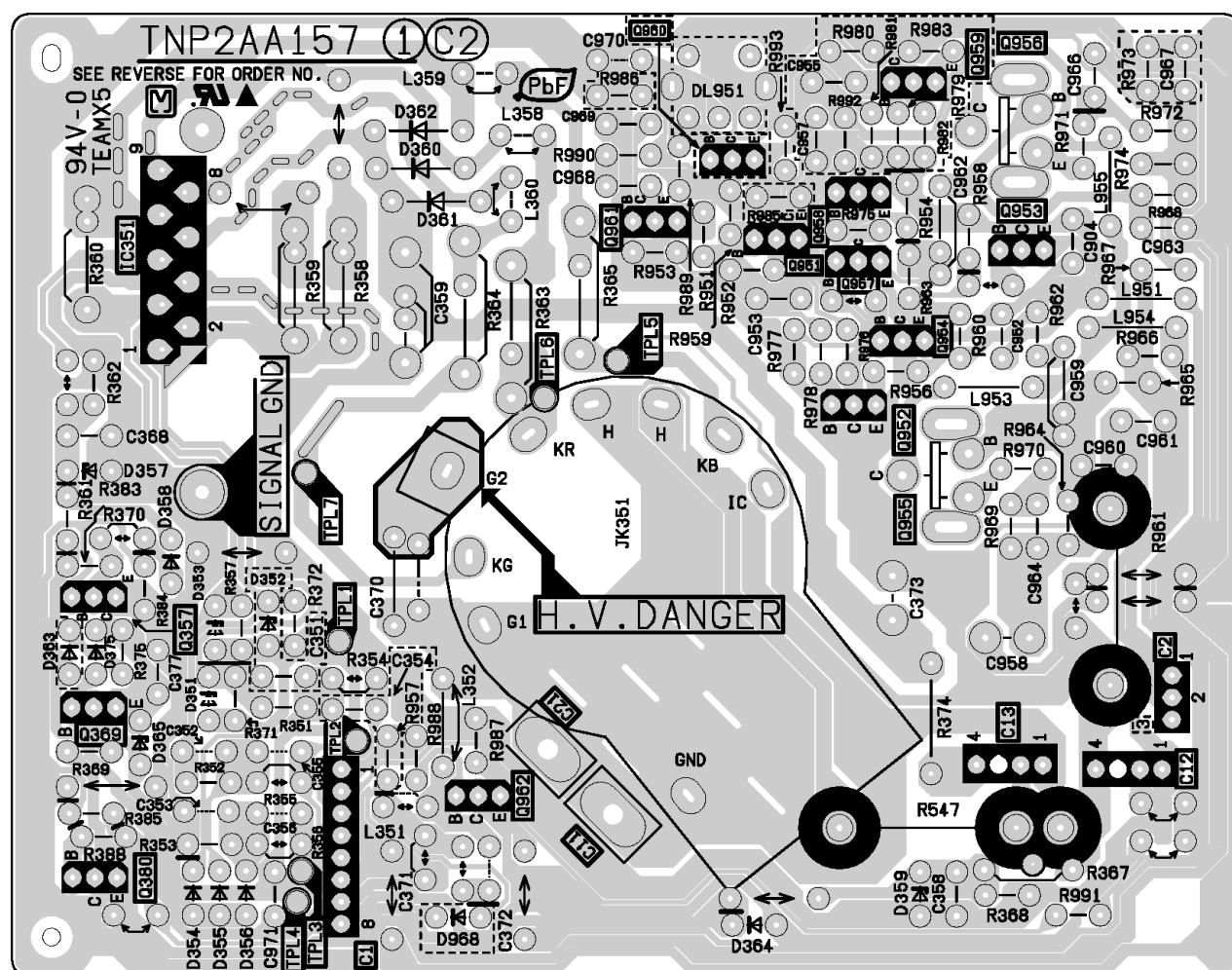
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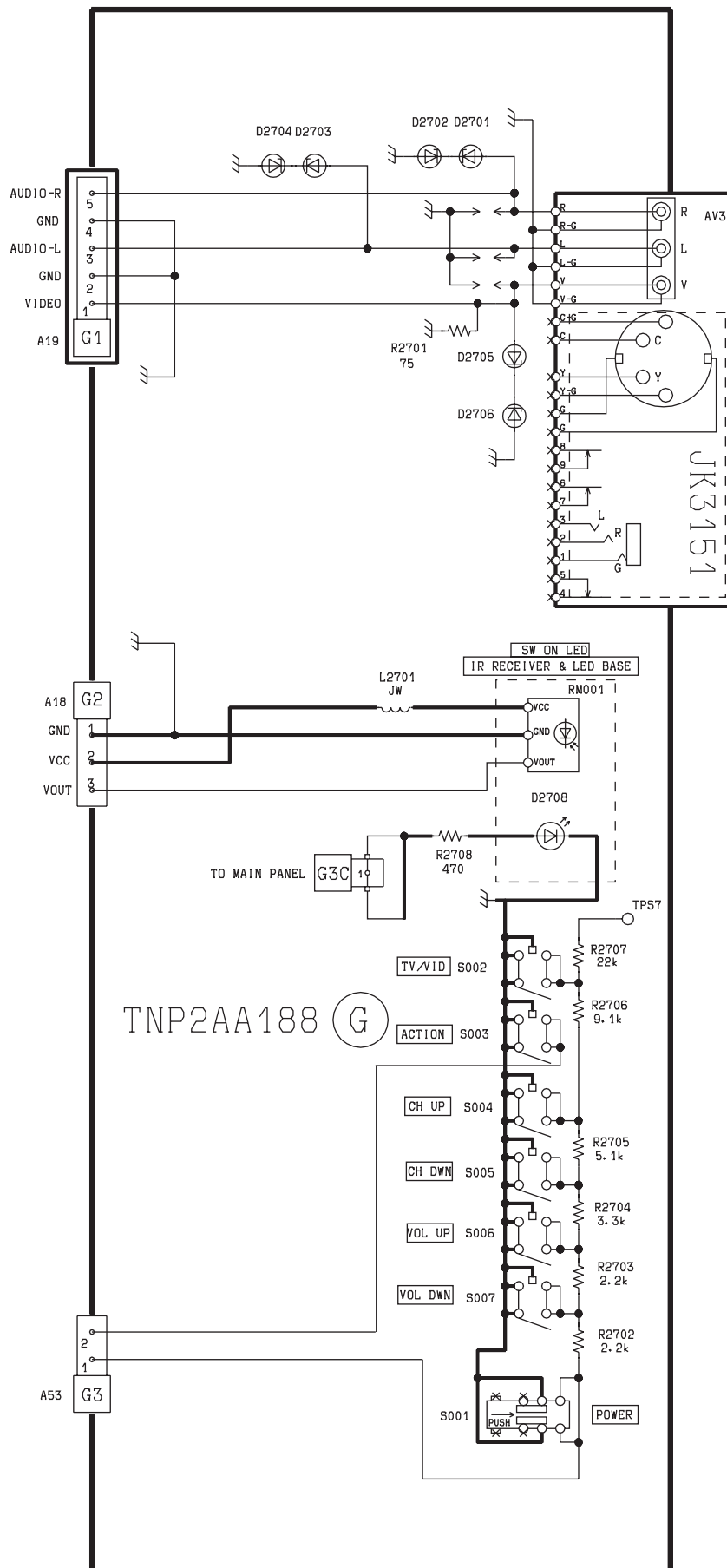
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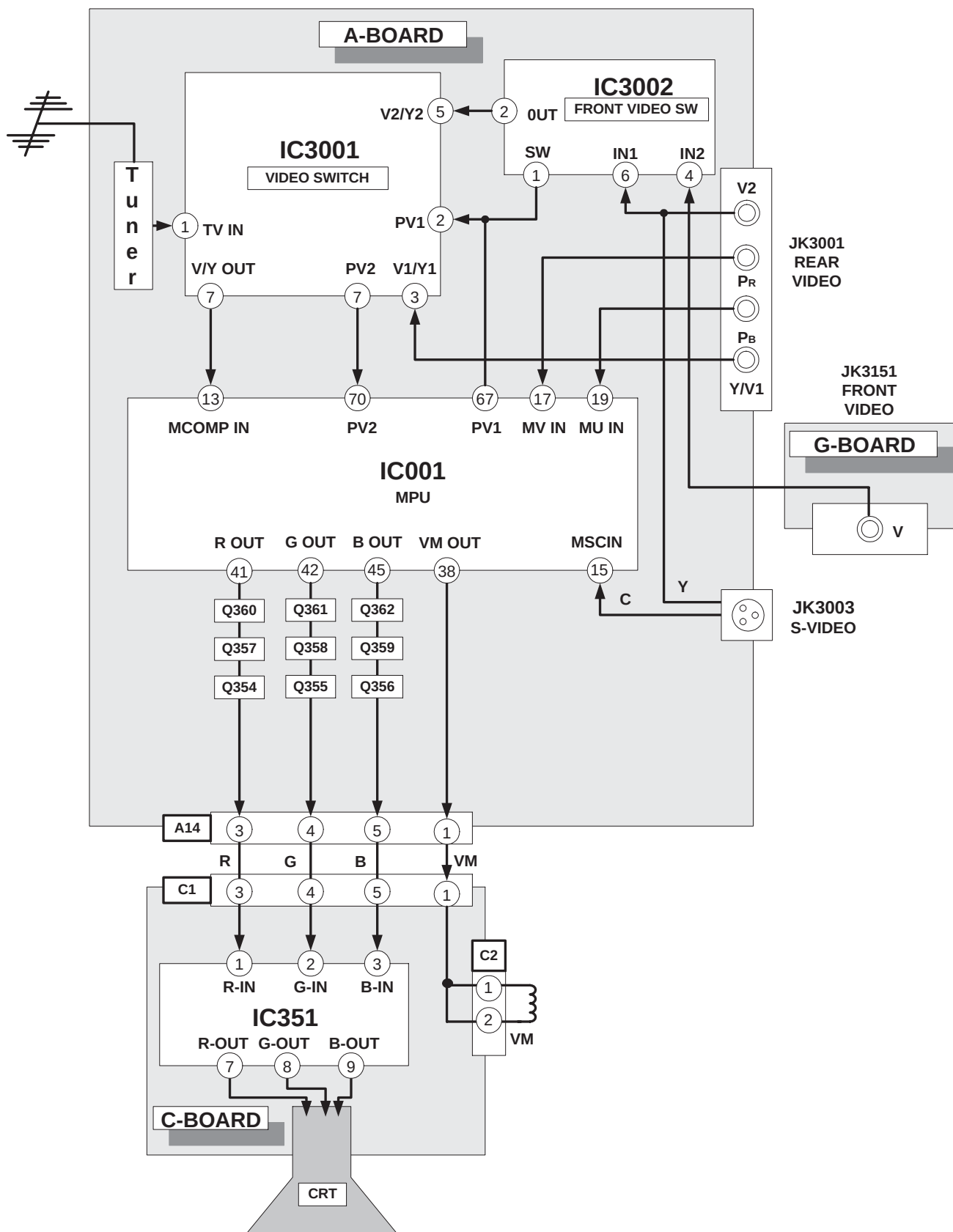
7

8





Video signal path block diagram



A - BOARD - TNP2AH060

IC001			
1	 0.00	43	2.50
2	 0.00	44	1.70
3	 0.00	45	0.00
4	 0.00	46	0.00
5	 0.00	47	3.30
6	 1.20	48	1.90
7	 1.20	49	1.90
8	 1.30	50	1.60
9	 3.30	51	1.70
10	 0.00	52	3.30
11	 2.70	53	1.70
12	 1.50	54	1.40
13	 1.40	55	3.30
14	 0.40	56	1.40
15	 1.60	57	0.00
16	 2.20	58	0.00
17	 1.70	59	3.30
18	 1.70	60	3.30
19	 1.40	61	3.30
20	 1.40	62	0.70
21	 1.00	63	3.30
22	 2.60	64	3.30
23	 0.00	65	3.40
24	 1.90	66	3.50
25	 1.90	67	0.10
26	 1.40	68	3.20
27	 1.28	69	0.00
28	 0.00	70	0.00
29	 1.30	71	0.00
30	 1.80	72	5.20
31	 1.00	73	5.20
32	 3.30	74	0.00
33	 1.70	75	0.00
34	 0.80	76	0.00
35	 0.00	77	3.30
36	 0.60	78	0.00
37	 3.30	79	0.00
38	 3.30	80	3.30
39	 2.30	81	5.20
40	 1.70	82	3.30
41	 0.40	83	0.00
42	 0.40	84	3.30

IC002	
1	 0.00
2	 0.00
3	 0.00
4	 0.00
5	 3.40
6	 3.40
7	 5.20
8	 5.20

IC003	
1	 0.00
2	 3.31
3	 3.27

IC004	
1	 0.00
2	 0.00
3	 0.00
4	 3.30
5	 3.30

IC005	
1	 9.10
2	 3.30
3	 0.00
4	 9.10

IC451	
1	2.00
2	27.80
3	1.20
4	0.00
5	17.60
6	27.90
7	2.00

IC501	
1	 0.00
2	 1.35
3	 0.00
4	 1.05
5	 3.30

IC551	
1	 12.20
2	 0.00
3	 9.00

IC552	
1	 7.50
2	 0.00
3	 5.00

IC801↓	
1	-21.00
2	 N/C
3	 0.10
4	 N/C
5	 GND
6	 32.24
7	 1.50

IC802↓	
1	 2.30
2	 32.24

IC2201			
1	1.60	13	 2.80
2	2.20	14	 2.20
3	2.20	15	 2.50
4	2.30	16	 3.50
5	2.40	17	 0.00
6	0.07	18	 3.20
7	5.00	19	 3.40
8	2.50	20	 0.00
9	2.60	21	 2.20
10	0.80	22	 2.20
11	2.30	23	 2.20
12	2.50	24	 2.20

IC2501			
1	4.40	16	 8.90
2	0.00	17	 0.00
3	0.00	18	 0.00
4	4.50	19	 3.80
5	4.50	20	 3.80
6	4.50	21	 4.40
7	4.50	22	 4.80
8	4.50	23	 4.40
9	1.00	24	 4.50
10	4.50	25	 4.60
11	3.60	26	 4.50
12	3.60	27	 4.50
13	2.90	28	 0.00
14	3.20	29	 0.00
15	0.00	30	 4.40

IC3001	
1	4.10
2	0.20
3	4.10
4	0.00
5	4.10
6	9.00
7	4.30
8	0.00

IC3002	
1	0.20
2	4.40
3	8.90
4	5.10
5	0.00
6	5.10

IC2301	
1	 7.50
2	 5.60
3	 21.00
4	 0.00
5	 5.60
6	 7.50
7	 10.60
8	 1.30
9	 0.00
10	 22.70
11	 3.20
12	 10.20

IC3101	
1	 0.10
2	 4.40
3	 4.40
4	 4.40
5	 7.80
6	 7.80
7	 0.00
8	 4.40
9	 4.40
10	 4.40
11	 0.00
12	 0.00
13	 0.00
14	 8.90

IC4801	
1	 5.10
2	 5.10
3	 3.30
4	 3.30
5	 0.00
6	 2.50
7	 2.50
8	 4.90
9	 4.90
10	 9.00

A - BOARD - TNP2AH060

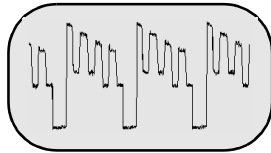
	Q001	Q057	Q058	Q070	Q092	Q2350	Q2361	Q2362	Q2363
B	0.00	1.50	1.50	4.12	8.90	5.35	0.30	0.00	1.34
C	13.00	0.00	0.00	8.90	1.40	0.00	0.00	0.10	0.00
E	0.00	0.07	0.07	3.50	3.30	3.14	0.00	0.00	1.50
	Q3001	Q3002	Q3193	Q3194	Q354	Q355	Q356	Q357	Q358
B	1.30	1.30	0.60	0.05	4.50	4.30	4.40	2.60	2.60
C	3.30	3.30	0.03	7.80	8.50	8.40	8.40	4.50	4.30
E	0.70	0.70	0.00	0.00	3.80	3.60	3.70	2.00	2.00
	Q359	Q360	Q361	Q362	Q411	Q412	Q451	Q4801	Q501
B	2.60	0.50	0.40	0.40	2.25	2.90	5.10	0.40	0.40
C	4.40	0.00	0.00	0.00	0.00	9.00	1.40	2.10	56.80
E	2.00	1.10	1.10	1.10	2.90	2.40	3.30	0.00	0.00
	Q551	Q560	Q605	Q606	Q801	Q802	Q820	Q830	Q831
B	0.00	0.30	4.80	0.00	0.00	0.70	130.40	129.80	0.60
C	14.70	0.00	0.00	3.30	12.52	0.00	0.00	130.40	0.20
E	0.00	0.60	4.70	0.00	0.00	0.00	130.80	130.50	0.00
	Q751		Q757	Q901	Q902				
G	7.50	B	0.00	1.00	5.20				
D	8.90	C	7.60	5.20	2.40				
S	0.00	E	0.00	0.40	5.80				

C - BOARD - TNP2AA157

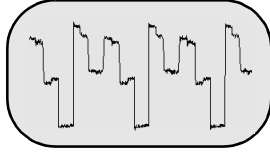
IC351			Q951	Q952	Q953	Q954	Q955
1	.....	2.40	1.90	1.50	6.30	5.10	122.70
2	.....	2.40	8.90	5.70	8.90	0.00	105.30
3	.....	2.40	1.50	1.50	5.70	5.60	121.90
4	.....	0.00					
5	.....	2.50					
6	...	216.80					
7	...	145.30					
8	...	152.70					
9	...	151.00					
			Q956	Q957	Q958	Q961	Q962
B			0.80	5.80	5.70	0.30	2.40
C			65.20	0.00	8.90	1.80	8.90
E			0.30	6.30	5.10	0.00	1.90

CT-27SC14J/UJ MODELS

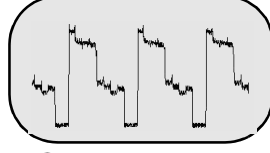
A-Board



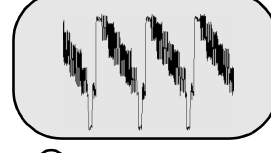
① **46 Vpp**
A14 PIN 5 (BLUE OUT)



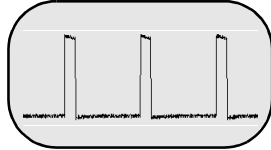
② **4.60 Vp-p**
A14 PIN 3 (RED OUT)



③ **4.5 Vp-p**
A14 PIN 4 (GREEN OUT)



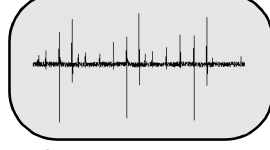
④ **0.9 Vp-p**
TPA5 (VIDEO)



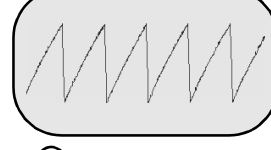
⑤ **3.30 Vp-p**
IC001 PIN 36 (FBP IN)



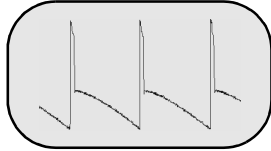
⑥ **10MHz X'tal**
IC001 PIN 50 (OSC)



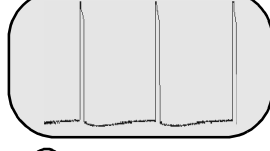
⑦ **780mVp-p**
IC451 PIN 1 (VERT IN)



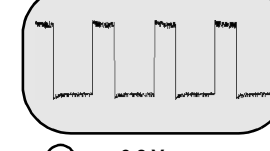
⑧ **2.20 Vp-p**
Q411 B (V DRIVE)



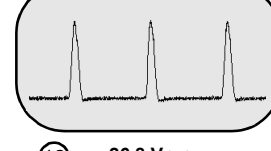
⑨ **57.8 Vp-p**
IC451 PIN 5 (V OUT)



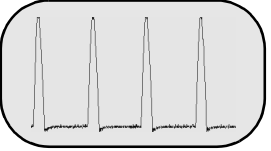
⑩ **30.4 Vp-p**
IC451 PIN 3 (PUMP UP)



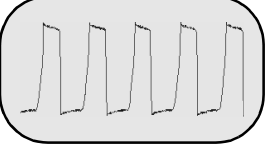
⑪ **3.8 Vp-p**
IC501 PIN 4 (H-DRIVE)



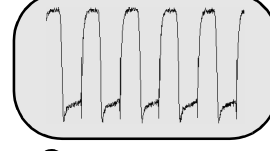
⑫ **26.8 Vp-p**
A12 PIN 2 (HEATER)



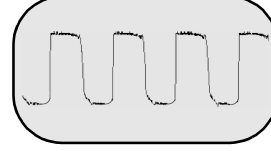
⑬ **.508 KVp-p**
Q551 Collector (H OUT)



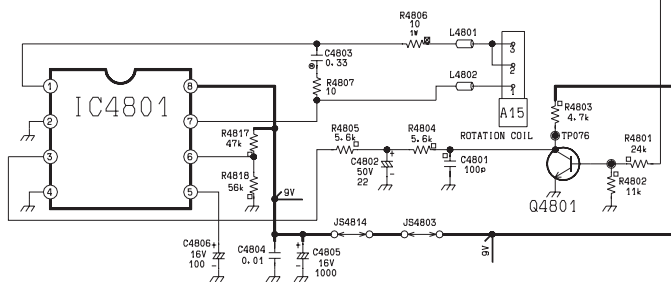
⑭ **408 Vp-p**
IC801 PIN 1



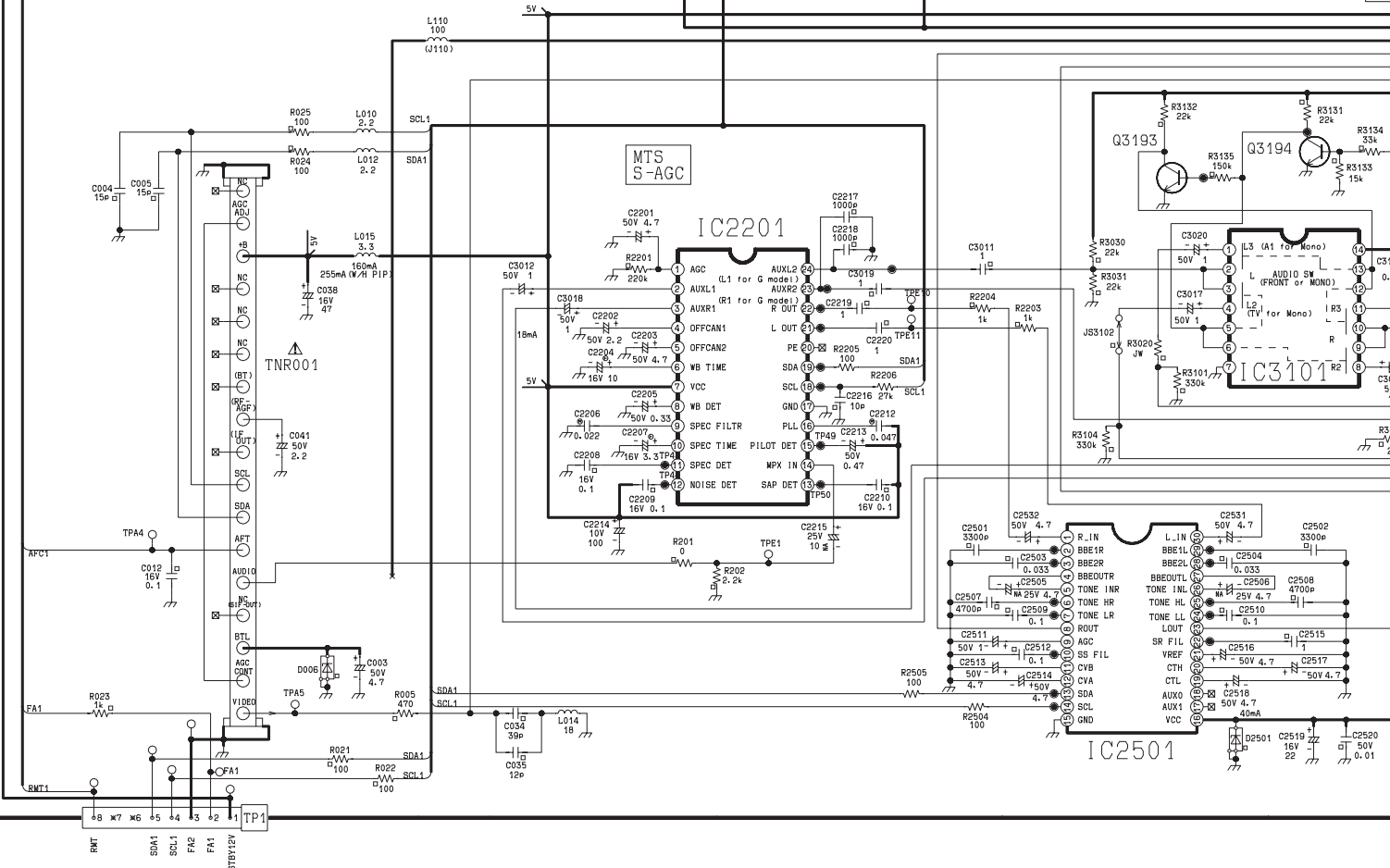
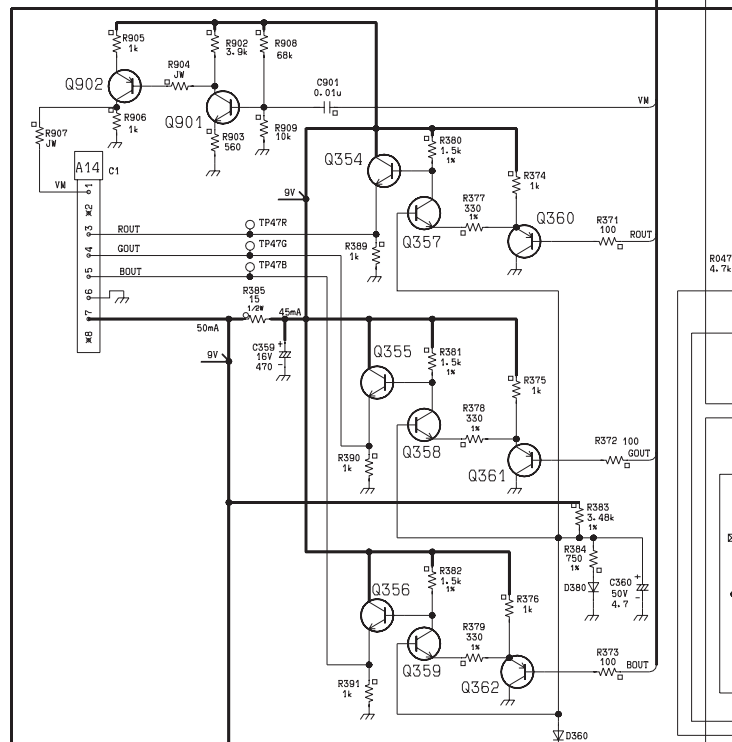
⑮ **2.76 Vp-p**
IC801 PIN 7

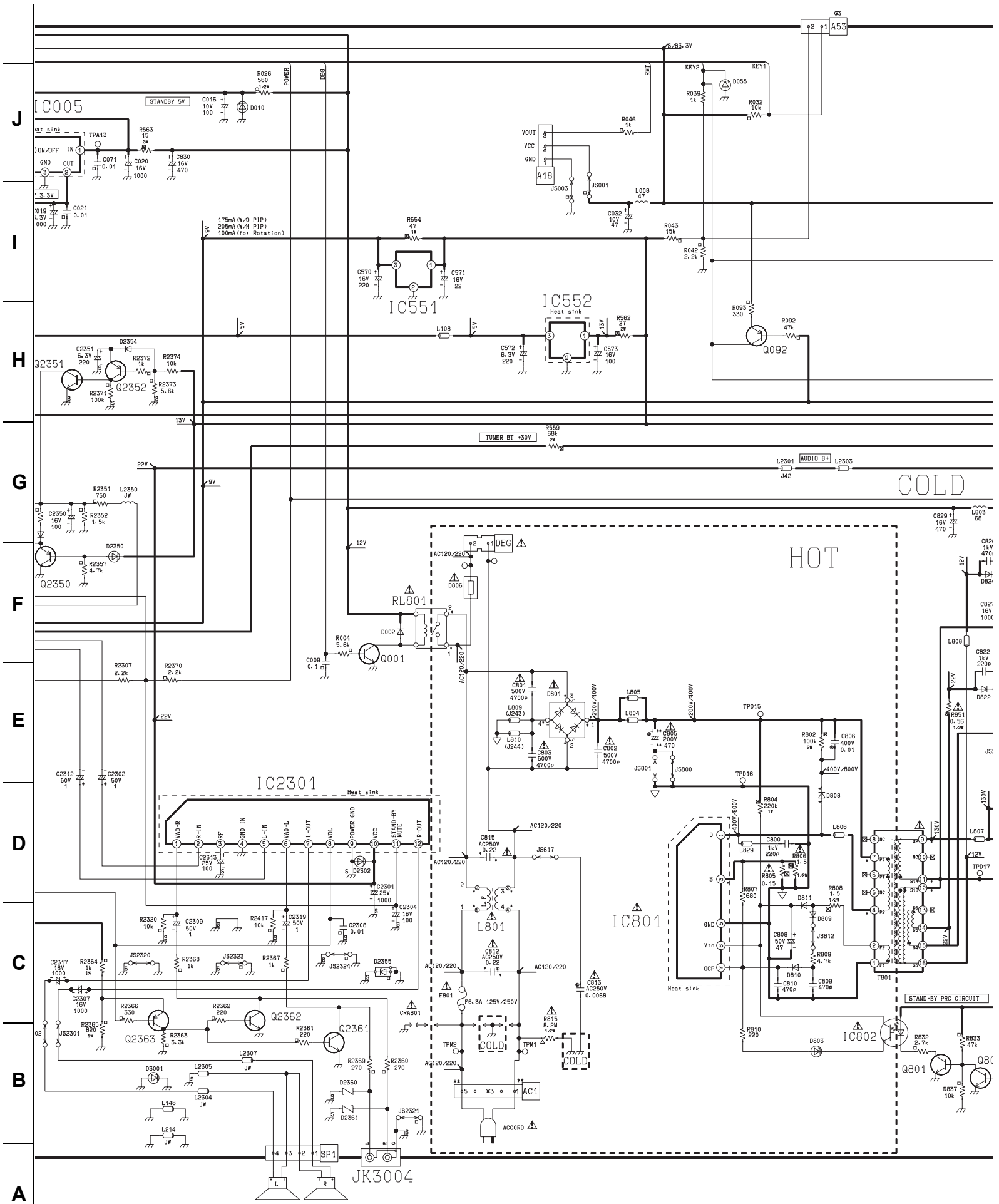


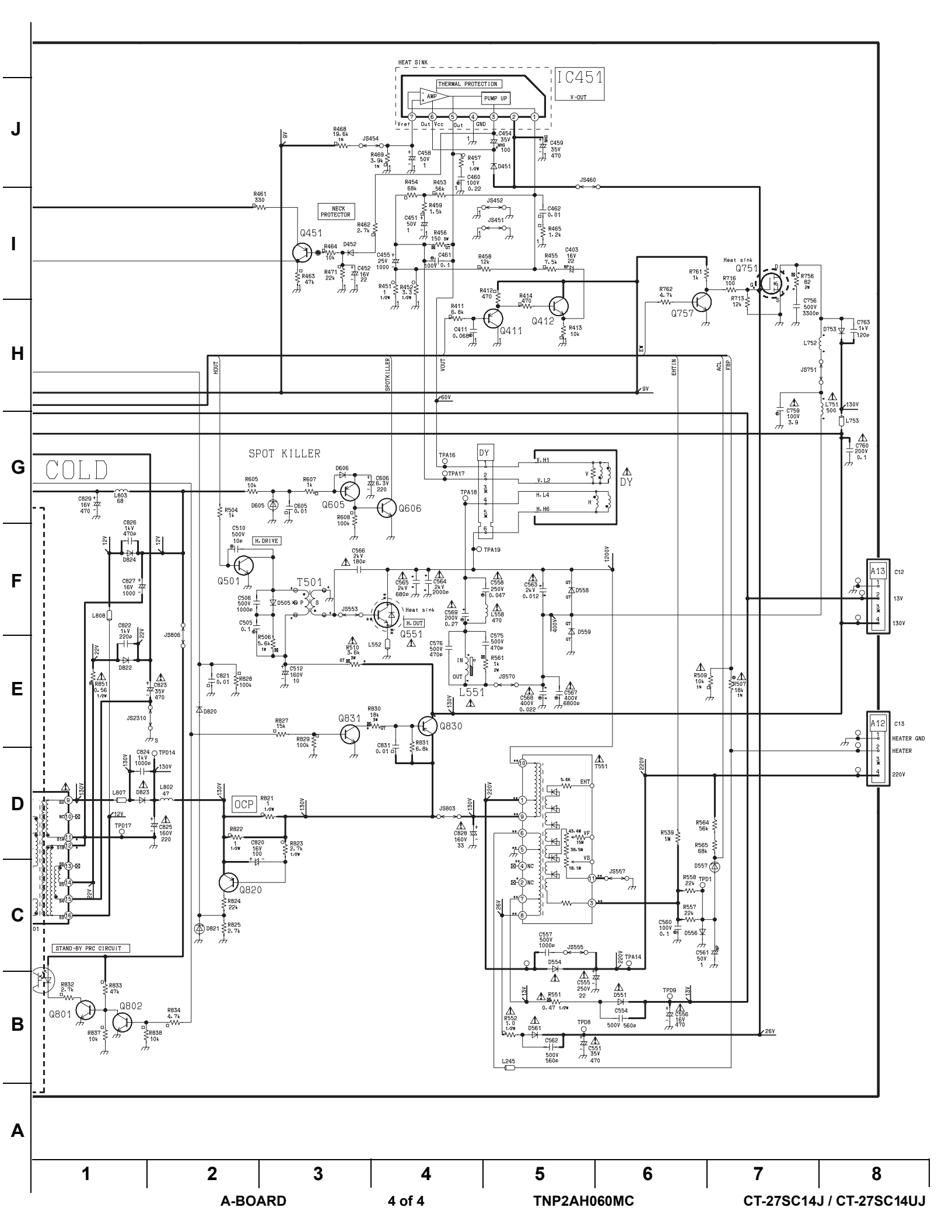
⑯ **110 Vp-p**
Q501 Collector



TNP2AH060MC (A)







MTNC030623C1

B01/B05

Service Manual

Color Television

CT-25L8G / CT-25L8UG / CT-20L8G / CT-20G8G / CT-20G8SG

NA10



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⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Panasonic®

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by ⚠ in the Schematic Diagrams, Circuit Board Diagrams, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

1. Safety precautions

General guidelines

An isolation transformer should always be used during the servicing of a receiver whose chassis is not isolated from AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks. It will also protect the receiver from being damaged by accidental shorting that may occur during servicing. When servicing, observe the original lead dress, especially in the high voltage circuit. Replace all damaged parts (also parts that show signs of overheating.)

Always replace protective devices, such as fuse, isolation resistors and capacitors, and shields after servicing the receiver. Use only manufacturer's recommended rating for fuses, circuit breakers, etc.

High potentials are present when this receiver is operating. Operation of the receiver without the rear cover introduces danger for electrical shock. Servicing should not be performed by anyone who is not thoroughly familiar with the necessary precautions when servicing high voltage equipment.

Extreme care should be practiced when handling the picture tube. Rough handling may cause it to implode due to atmospheric pressure. (14.7 lbs per sq. in.). Do not nick or scratch the glass or subject it to any undue pressure. When handling, use safety goggles and heavy gloves for protection. Discharge the picture tube by shorting the anode to chassis ground (not to the cabinet or to other mounting hardware). When discharging connect cold ground (i.e. tag ground lead) to the anode with a well insulated wire or use a grounding probe. Avoid prolonged exposure at close range to unshielded areas of the picture tube to prevent exposure to x ray radiation.

The test picture tube used for servicing the chassis at the bench should incorporate safety glass and magnetic shielding. The safety glass provides shielding for the tube viewing area against x ray radiation as well as implosion. The magnetic shield limits the x ray radiation around the bell of the picture tube in addition to the restricting magnetic effects. When using a picture tube test jig for service, ensure that the jig is capable of handling 50kV without causing x ray radiation.

Before returning a serviced receiver to the owner, the service technician must thoroughly test the unit to ensure that it is completely safe to operate. Do not use a line isolation transformer when testing.

Leakage current cold check

Unplug the A.C. cord and connect a jumper between the two plug prongs. Measure the resistance between the jumpered AC plug and exposed metallic parts such as screwheads, antenna terminals, control shafts, etc. If the exposed metallic part has a return path to the chassis, the reading should be between 240k Ω and 5.2M Ω . If the exposed metallic part does not have a return path to the chassis, the reading should be infinite.

Leakage current hot check

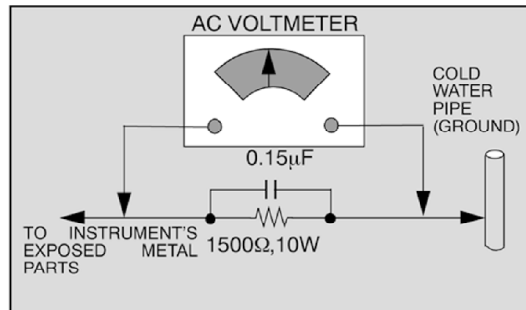
Plug the AC cord directly into the AC outlet. Do not use an isolation transformer during the check. Connect a 1.5k Ω 10 watt resistor in parallel with a 0.15 μ F capacitor between an exposed metallic part and ground. Use earth ground, for example a water pipe.

Using a DVM with a 1000 ohms/volt sensitivity or higher, measure the AC potential across the resistor.

Repeat the procedure and measure the voltage present with all other exposed metallic parts. Verify that any potential does not exceed 0.75 volt RMS. A leakage current tester (such as a Simpson model 229, Sencore model PR57 or equivalent) may be used in the above procedure, in which case any current measure must not exceed 0.5 milliamp. If any measurement is out of the specified limits, there is a possibility of a shock hazard and the receiver must be repaired and

rechecked before it is returned to the customer.

Hot check circuit



Insulation test

Connect an insulation tester between an exposed metallic part and A.C. line. Apply 1080VAC/ 60Hz for 1 second. Confirm that the current measurement is 0.5mA ~ 2.0mA. Repeat test with other metallic exposed parts.

X ray radiation

WARNING

The potential source of x ray radiation in the TV set is in the high voltage section and the picture tube.

NOTE

It is important to use an accurate, calibrated high voltage meter.

Set the brightness, picture, sharpness and color controls to minimum.

Measure the high voltage. The high voltage should be $27.70 \pm 1.25\text{kV}$ for 20" models and $29.25 \pm 1.25\text{kV}$ for 25" models . If the upper limit is out of tolerance, immediate service and correction is required to insure safe operation and to prevent the possibility of premature component failure.

Horizontal oscillator disable circuit test

This test must be performed as a final check before the receiver is returned to the customer. See horizontal oscillator disable circuit procedure check in this manual.

2. Service notes

NOTE

These components are affixed with glue. Be careful not to break or damage any foil under the component or at the pins of the ICs when removing. Usually applying heat to the component for a short time while twisting with tweezers will break the component loose.

Leadless chip component (surface mount)

Chip components must be replaced with identical chips due to critical foil track spacing. There are no holes in the board to mount standard transistors or diodes. Some chip capacitor or resistor board solder pads may have holes through the board, however the hole diameter limits standard resistor replacement to 1/8 watt. Standard capacitor may also be limited for the same reason. It is recommended that identical components be used.

Chip resistor have a three digit numerical resistance code, 1st and 2nd significant digits and a multiplier. Example: 162 = 1600 or 1.6k Ω resistor, 0 = 0 Ω (jumper).

Chip capacitors generally do not have the value indicated on the capacitor. The color of the component indicates the general range of the capacitance.

Chip transistors are identified by a two letter code. The first letter indicates the type and the second letter, the grade of transistor.

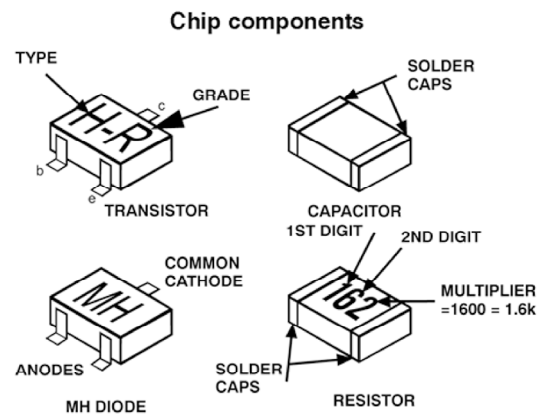
Chip diodes have a two letter identification code as per the code chart and are a dual diode pack with either common anode or common cathode. Check the parts list for correct diode number.

Component removal

1. Use solder wick to remove solder from component end caps or terminal.
2. Without pulling up, carefully twist the component with tweezers to break the adhesive.
3. Do not reuse removed leadless or chip components since they are subject to stress fracture during removal.

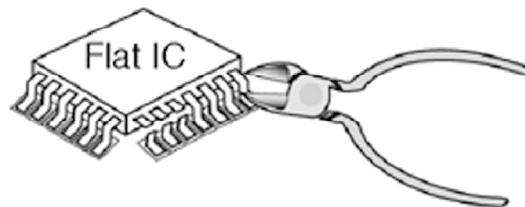
Chip component installation

1. Put a small amount of solder on the board soldering pads.
2. Hold the chip component against the soldering pads with tweezers or with a miniature alligator clip and apply heat to the pad area with a 30 watt iron until solder flows. Do not apply heat for more than 3 seconds.

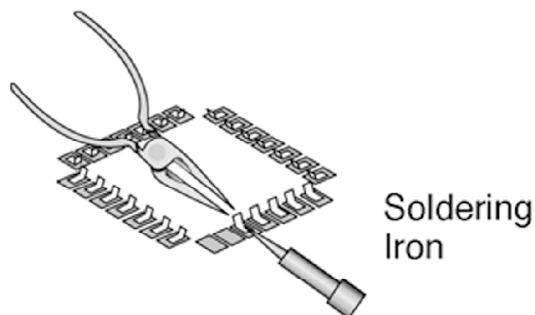


How to replace flat ic (required tools)

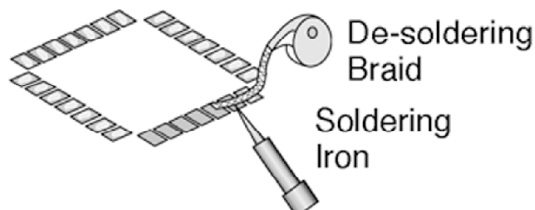
- 1. Remove the solder from all of the pins of a Flat IC by using a desolder braid**



- 2. Put the iron wire under the pins of the Flat IC and pull it in the direction indicated while heating the pins using a soldering iron. A small awl can be used instead of the iron wire.**

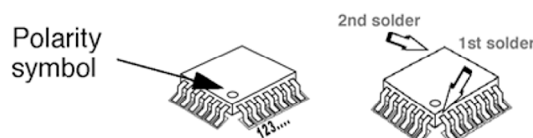


- 3. Remove the solder from all the pads of the Flat IC by using a de solder braid**



- 4. Position the new Flat IC in place (apply the pins of the Flat IC to**

the soldering pads where the pins need to be soldered). Properly determine the positions of the soldering pads and pins by correctly aligning the polarity symbol



5. Solder all pins to the soldering pads using a fine tipped soldering iron



6. Check with a magnifier for solder bridge between the pins or for dry joint between pins and soldering pads. To remove a solder bridge, use a de solder braid as shown in the figure below



IMPORTANT

To protect against possible damage to the solid state devices due to arcing or static discharge, make certain that all ground wires and CRT DAG wire are securely connected.

CAUTION

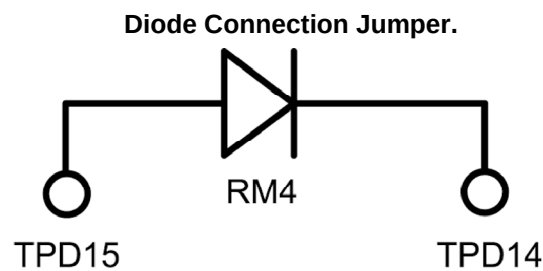
The power supply circuit is above earth ground and the chassis cannot be polarized. Use an isolation transformer when servicing the receiver to avoid damage to the test equipment or to the chassis. Connect the test equipment to the proper ground(hot) or (cold) when servicing, or incorrect voltages will be measured.

2.1. X-Ray Protection Circuit Check& Adjustments

This test must be performed as final check before the receiver is returned to the customer. If voltages are out of tolerance, immediate service and correction is required to insure safe operation and to prevent the possibility of premature component failure.

Equipment:

1. Isolation transformer.
2. High voltage meter.
3. D.C. Ammeter
4. Short jumper.
5. HHS jig (See figure below).



Preparation:

1. Make sure the receiver is turned off.
2. Connect the receiver to an isolation transformer.
3. Connect the ammeter serial from the flyback anode lead to the picture tube anode socket.
4. Prepare short jumper and HHS jig.

Procedure:

1. Connect the short jumper between TPD16 & TPD17.
2. Connect the jumper diode between TPD14 and TPD15 (anode connected to TPD15 and cathode to TPD14).
3. Apply 75VAC to AC input of isolation transformer.
4. Turn the receiver on.
5. Apply a monoscope pattern.
6. Set customer picture and brightness controls to the minimum.
7. tSet current within 50 μ A to 100 μ A by changing the picture and bright controls.

8. Slowly increase AC voltage at the input of the isolation transformer and confirm HHS voltage measure 31kV for 20" models and 33kV for 25" models.
9. Turn power off and remove jigs.

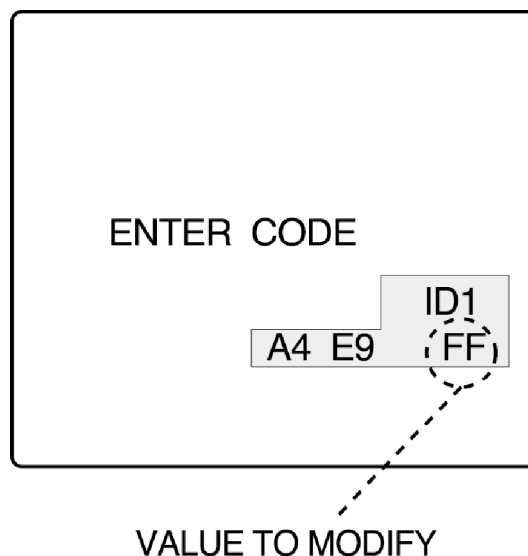
3. EEPROM replacement

If a new EEPROM integrated circuit is replaced for servicing, follow the next procedure once that the memory is properly assembled:

1. Turn the TV set ON.
2. Enter to service mode.
3. Once inside service mode the first image that appears on-screen is the ID1 register with the respective address value (FF) like the image below.

Note:

All 3 registers (ID1,ID2,ID3) should appear with FF values if a new EEPROM is assembled.



4. With "VOL" keys adjust the correct value according with the service adjustment table (see "Service Mode" section in page 15).
5. Change to the next ID switch register with "CH" keys and repeat the same procedure as step 4.
6. When replacing a new EEPROM be sure to set the correct ID switch values for each model.

7. Once that all 3 registers are set with the correct address value, perform all of the remaining adjustments and servicing.

IMPORTANT:

Correct ID switch configuration should be input when replacing EEPROM for each television model, otherwise if wrong values are configured, the television software will not function accordingly and properly.

4. About lead free solder (PbF)

NOTE

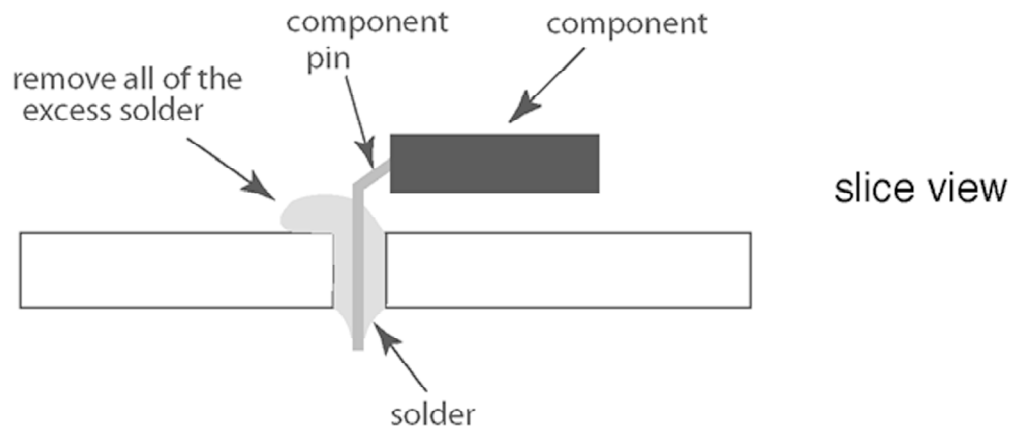
Lead is listed as (Pb) in the periodic table of elements. / In the information below, Pb will refer to lead solder, and PbF will refer to Lead Free Solder. / The lead free solder used in our manufacturing process and discussed below is (Sn+Ag+Cu). / That is Tin (Sn), Silver (Ag) and Copper (Cu) although other types are available.

This model uses Pb Free solder in its manufacture due to environmental conservation issues. For / service and repair work, we'd suggest the use of Pb free solder as well, although Pb solder may be / used. / PCBs manufactured using lead free solder will have the "PbF" or a leaf symbol stamped on the / back of PCB.



CAUTION

- Pb free solder has a higher melting point than standard solder. Typically the melting point is 50 ~ 70 °F (30 ~ 40 °C) higher. Please use a high temperature soldering iron and set it to 700 ± 20 °F (370 ± 10 °C).
- Pb free solder will tend to splash when heated too high (about 1100 °F or 600 °C). / If you must use Pb solder, please completely remove all of the Pb free solder on the pins or solder area before applying Pb solder. If this is not practical, be sure to heat the Pb free solder until it melts, before applying Pb solder.
- After applying PbF solder to double layered boards, please check the component side for excess solder which may flow onto the opposite side.



Suggested Pb free solder

There are several kinds of Pb free solder available for purchase. This product uses Sn+Ag+Cu (tin, silver, copper) solder. However, Sn+Cu (tin, copper), Sn+Zn+Bi (tin, zinc, bismuth) solder can also be used.

0.3mm X 100g	0.6mm X 100g	1.0mm X 100g

5. Receiver feature table

FEATURE/MODEL	CT-25L8G/UG	CT-20L8G	CT-20G8G/SG
CHASSIS	AP403	BP398	AP398
MICRO	128K		
MENU LANGUAGE	ENG/SPAN/FR		
CLOSED CAPTION	X		
V-CHIP (USA/CANADA)	X		
CHANNEL COUNT	181		
REMOTE CONTROL	EUR7713010		
CRT SUPPLIER	PANABLACK, SAMSUNG		
CHASSIS	NA10		
COMB FILTER	DIGITAL		
V/A NORM (X=BOTH)	V		
MTS/SAP/DBX	X		
BUILT-IN AUDIO POWER	1.5Wx2 (10%)		
No. OF SPEAKERS	2		
AI SOUND	X		
A/V IN (REAR/FRONT)	2(2/1)		1(1/1)
COMPONENT INPUT (Y, Pb, Pr)	1	----	
S-VIDEO INPUT (REAR/FRONT)	2/1	1/0	

Note:

Specifications are subject to change without notice or obligation. Dimensions and weights are approximate.

6. Board description table

CT-20G8/CT-20G8S

BOARD	PART NUMBER	DESCRIPTION
A	TNP2AH047AA	MAIN BOARD
C	TNP2AA122AA	CRT BOARD

CT-20L8G

BOARD	PART NUMBER	DESCRIPTION
A	TNP2AH047AB	MAIN BOARD
C	TNP2AA122AA	CRT BOARD

CT-25L8G/CT-25L8UG

BOARD	PART NUMBER	DESCRIPTION
A	TNP2AH047FA	MAIN BOARD
C	TNP2AA122FA	CRT BOARD

NOTE

When ordering a replacement board assembly, append an "S" to the board number

EXAMPLE

To order the A Board, the replacement board is TNP2AH047AAS.

7. TV Location of controls



Quick reference control operation	
1	Power - Press to turn ON or OFF.
2	Volume - Press to adjust sound level, or to adjust audio menus, video menus, and select operating features when menus are displayed
3	Channel - Press to select programmed channels. Press to highlight desired features when menus are displayed. Also use to select cable converter box channels after programming remote control infra-red codes (the TV/AUX/CABLE switch must be set in CABLE position).
4	Action - Press to display main menu and access on screen feature and adjustment menus.
5	TV/Video - Press to select TV or one of the video inputs, for the main picture or the PIP frame (when PIP frame is displayed).

8. Location of controls (EUR7713010 remote)



Note:

For additional information about this remote please refer to the owner's manual section remote operation, listed on the parts list section.

9. Dissassembly for service

Back cover

Remove all the screws marked with an arrow (←) from the back of the receiver

NOTE

Screw configuration, type, and number of screws vary depending on the model of the receiver serviced and the application; various models are covered in this manual. Use same hardware when reassembling the receiver.

- 3 screws at the top edge of the receiver (for 25" sets).
- 2 screws at the top edge of the receiver (for 20" sets).
- 1 screw by the A/V jacks.
- 1 screw at each lower corner of the receiver.
- 1 screw by the Flyback.

A-Board - Main chassis

1. Slide the chassis completely out of the guide rails.
2. Stand the receiver on its edge. The underside of the board is completely accessible for component replacement.

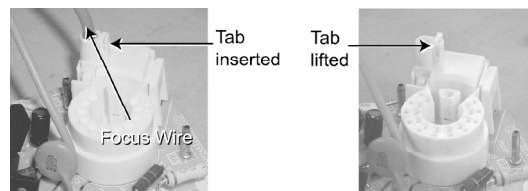
Note:

Some tie-wraps that secure the wire dressings may need to be unfastened for chassis removal.

C-Board - CRT output

The board plugs onto the socket on the CRT neck. To release the Focus wire, use a dull object to release the tab on the socket (near the wire opening) and carefully pull on the wire. To connect the focus wire, press on the tab to lock it then insert the wire in the opening and press on it until it is fully inserted and locked in place.

Focus cable release



Speakers

Each speaker is secured to the cabinet with 4 screws.

NOTE

When reassembling speakers be sure to connect the speaker wires to the correct speaker lead (+) (-)

9.1. Disassembly for CRT replacement

- 1. Discharge the CRT as instructed in the “safety precautions”.**
- 2. Disconnect the yoke (DY) plug, degaussing coil (DEG) plug from the main board.**
- 3. Unplug the CRT 2nd anode button from the main board.**
- 4. Remove the C-Board from the CRT base and unplug the black wires (CRT dag ground) C10 & C11.**
- 5. Disconnect the speakers plug from the A-Board.**
- 6. Lift the main chassis (A-Board) and all mounted boards completely out with the CRT board attached.**
- 7. Perform complete removal of chassis, as instructed in “disassembly for service” section.**

CRT replacement

- 1. Perform “disassembly for CRT replacement” procedure.**
- 2. Insure that the CRT H.V. Anode button is discharged before handling the CRT. Read the “safety precautions” section on handling the picture tube.**
- 3. Remove the components from the CRT neck and place the cabinet face down on a soft pad.**
- 4. Note the original order for the CRT mounting hardware as they are remove from the CRT mounting brackets at each corner of the CRT.**
- 5. Remove the CRT with the degaussing coil and the dag ground braid attached.**
- 6. Note the original locations and mounting of the degaussing coil and the dag ground assembly to insure proper reinstallation on the replacement CRT.**

To remove and remount the degaussing coil:

- Unhook the coil spring from the bottom corners of the CRT ears.
- Release the braid loop from the upper corners of the CRT ears.

7. Mount the dag ground braid on the replacement CRT. Position the degaussing coil with new ties.

Dress coil as was on the original CRT.

8. Replace the components on CRT neck and reinstall into cabinet. Verify that all ground wires and circuit board plugs get connected.

IMPORTANT NOTICE

When ordering the CRT, please order CRT and CRT kit also.

Please see parts list section for part numbers

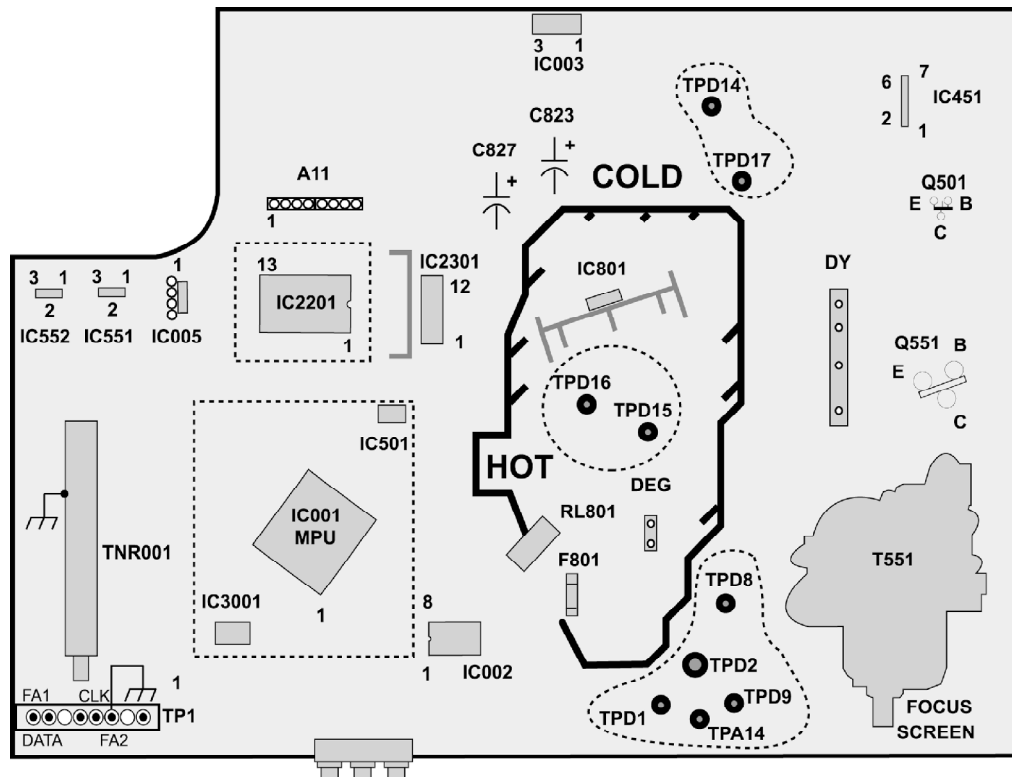
10. Chassis service adjustment procedures

All service adjustments are factory preset and should not require adjustment unless controls and/or associated components are replaced.

Note:

Connect the (-) lead of the voltmeter to the appropriate ground. Use IC801's heat sink when the HOT ground symbol is used. Otherwise, use COLD ground (Tuner shield, IC451's heat sink or FA2).

Component and Voltage Test Points



Note:

Components and test points within dotted areas are located on trace side.

B+ voltage check

- 1. Set the BRIGHT and PICTURE to minimum by using the PICTURE menu.**
- 2. Connect the DVM between C825 (+ side) or TPD14 and cold ground.**
- 3. Confirm that B+ voltage is $131.0V \pm 2.0V$. This voltage supplies B+ to the horizontal output and flyback circuits.**

Source voltage chart

120V AC line input. Set the BRIGHT and the PICTURE to minimum by using the PICTURE menu. Use cold or hot ground for the (-) lead of the DVM as needed.

A-BOARD	TEST POINT	VOLTAGE 20"	VOLTAGE 25"
+B2	TPD14	131.0 ± 2.0V	131.0 ± 2.0V
SOUND	C823 (+)	18.4 ± 1.0V	18.4 ± 1.0V
STB12V	C827 (+)	12.7 ± 1.0 V	12.7 ± 1.0 V
220V	TPA14	217 ± 10 V	221 ± 10 V
VERTICAL	TPD8	23.7 ± 1.5V	27.1 ± 1.5V
9V	IC551 pin 3	9.0 ± 0.5V	9.0 ± 0.5V
5V	IC552 pin 3	5.0 ± 0.5V	5.0 ± 0.5V
3.3V	IC005 pin 2	3.3 ± 0.3V	3.3 ± 0.3V
EHT	CRT anode	27.70 ± 1.25kV	29.25 ± 1.25kV
HEATER	JK351 H-HGND	6.3 ± 0.24V	6.3 ± 0.24V

High voltage check

1. Select an active TV channel and confirm that horizontal is in sync.
2. Adjust BRIGHTNESS and CONTRAST using PICTURE icon menu so video just disappears.
3. Using a high voltage meter confirm that the high voltage is $27.70 \pm 1.25\text{kV}$ for 20" models and $29.25 \pm 1.25\text{kV}$ for 25" models.

11. Purity and convergence procedure

Adjustment is necessary only if the CRT or the deflection yoke is replaced or if the setting was disturbed. The complete procedure consists of:

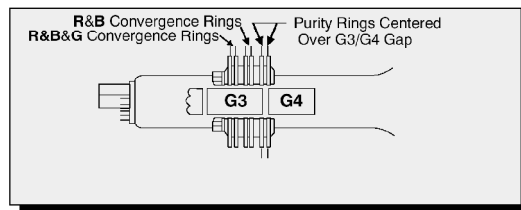
1. Vertical raster shift adjustment.
2. Initial static convergence.
3. Setting the purity.
4. Final static convergence.

WHEN THE CRT OR THE YOKE IS REPLACED

For 2 piece assembly:

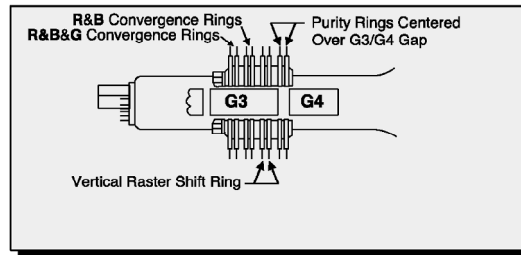
Position purity/convergence assembly as shown and tighten clamp snugly. Remove the hot-melt glue seal on assembly and position like tabs of purity device together at 12 o' clock to reduce its magnetic field effect.

2 piece assembly

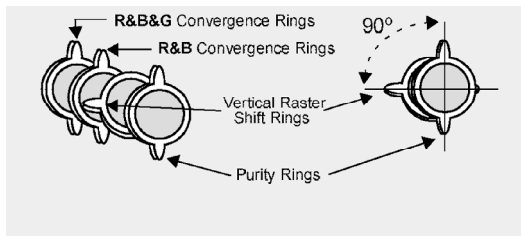


For models using 4 pairs of rings, place the yoke on the CRT neck (do not tighten the clamp). Place the vertical raster shift tabs at 3 o'clock (90° from the purity and convergence tabs).

Description of rings



Initial position of rings



Turn the receiver ON. Operate the receiver for 60 minutes using the first purity check field (white screen) to stabilize the CRT.

Fully degauss the receiver by using an external degaussing coil.

Slide the deflection yoke back and forth on the neck of the CRT until it produces a near white, uniform raster.

VERTICAL RASTER SHIFT ADJUSTMENT

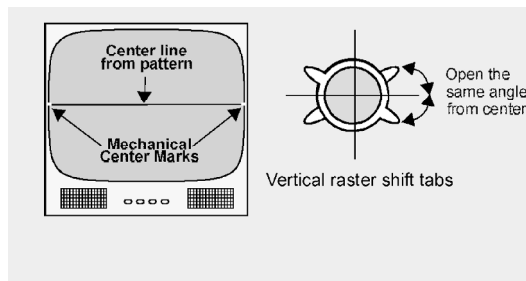
Apply a green pattern with a horizontal line, adjust the Deflection Yoke so that has no tilt, then secure it.

Adjust center line of the pattern with the mechanical center of the CRT, this center is determined by two marks at the side edges of the screen. To adjust the line, once the vertical raster shift tabs are place at 3 o'clock to reduce its magnetic field effect open the tabs the same angle from the center, until the center line of the pattern becomes a straight line, centered with the marks of the CRT.

IMPORTANT NOTICE

Rings come along with deflection yoke in one piece.

Vertical raster shift adjustment



INITIAL CENTER STATIC CONVERGENCE

Connect a dot/cross hatch generator to the receiver and tune in a signal. Observe misconvergence at center of the screen only.

Adjust the R&B pole magnets; by separating tabs and rotating to converge blue with red.

Adjust the R&B and R&B&G pole magnets: by separating tabs and rotating to converge blue and red (magenta) with green.

NOTE

Precise convergence at this point is not important.

PURITY ADJUSTMENT

When the receiver is in the serviceman mode for making electronic adjustments, press the RECALL button on the remote control to enter purity check. (See the service adjustments electronic controls procedure).

Operate the receiver for 60 minutes using the first purity check field (white screen) to stabilize the CRT.

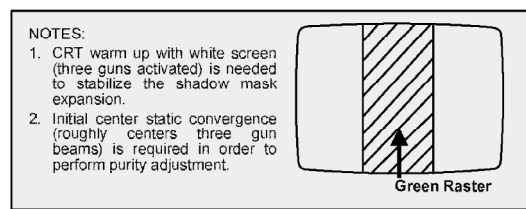
Fully degauss the receiver by using an external degaussing coil.

Press the RECALL button on the remote control again until the purity check (green screen) appears.

Loosen the deflection yoke clamp screw and move the deflection yoke back as close to the purity magnet as possible.

Adjust the purity rings to set the vertical green raster precisely at the center of the screen.

Green raster adjustment



Slowly move the deflection yoke forward until the best overall green screen is displayed.

Tighten the deflection yoke clamp screw.

Press the RECALL button on the remote control again until the purity check blue and red screens appear and observe that good purity is obtained on each respective field.

Press the RECALL button on the remote control again until purity check (white screen) appears.

Observe the screen for uniform white. If purity has not been achieved, repeat the above

procedure.

FINAL CONVERGENCE PROCEDURE

NOTE

Vertical size and focus adjustments must be completed prior to performing the convergence adjustment. Connect a dot pattern generator to the receiver. The brightness level should not be higher than necessary to obtain a clear pattern.

Converge the red and the blue dots at the center of the screen by rotating the R&B pole static convergence magnets.

Align the converged red/blue dots with the green dots at the center of the screen by rotating the R & B & G pole static convergence magnets. Melt wax with soldering iron to reseal the magnets. Slightly tilt vertically and horizontally (do not rotate) the deflection yoke to obtain a good overall convergence.

If convergence is not reached at the edges, insert permalloy in the DY corners to achieve proper convergence. Recheck for purity and readjust if necessary.

After vertical adjustment of the yoke, insert wedge at 11 o'clock position, then make the horizontal tilt adjustment.

Secure the deflection yoke by inserting four side wedges.

Apply adhesive between tab (thin portion) of wedge and CRT and place tape over the tab to secure to the CRT.

11.1. Permalloy convergence corrector strip (Part No. 0FMK014ZZ)

This strip is used in some sets to match the yoke and CRT for optimum convergence. If the yoke or CRT is replaced, the strip may not be required.

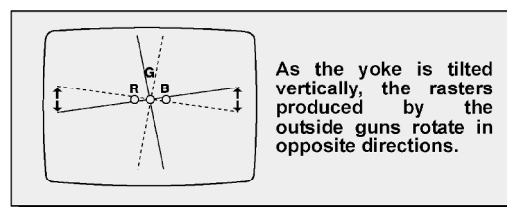
First converge the set without the strip and observe the corners.

First converge the set without the strip and observe the corners.

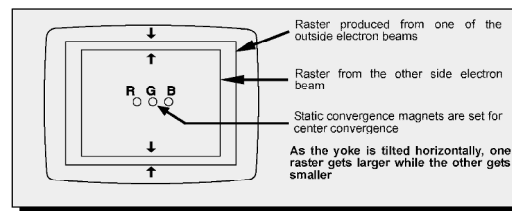
If correction is needed:

1. Place strip between CRT and yoke, in quadrant needing correction. Slowly move it around for desired results.
2. Press adhesive tightly to the CRT and secure with tape.

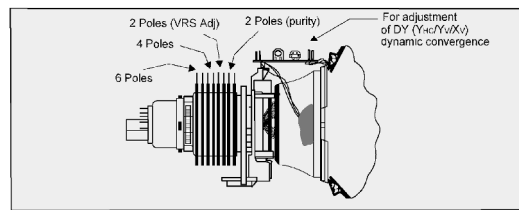
Vertical Yoke Movement



Horizontal Yoke Movement



Convergence Magnets and Wedges Location



12. Service mode (electronic adjustments)

This receiver has electronic technology using the IC bus concept. It performs as a control function and it replaces many mechanical controls. Instead of adjusting mechanical controls individually, many of the control functions are now performed by using “on screen display menu”. (The service adjustment mode).

NOTE

It is suggested that the technician reads all the way through and understand the following procedure for entering/exiting the service adjustment mode; then proceed with the instructions working with the receiver. When becoming familiar with the procedure, the flow chart for service mode may be used as a quick guide.

Quick entry to service mode

When minor adjustments need to be done to the electronic controls, the method of entering the service mode without removal of the cabinet back is as follows using the remote control:

1. Select SET-UP icon and select CABLE mode.
2. Select TIMER icon and set SLEEP time for 30 Min.
3. Press “ACTION” twice to exit menus.
4. Tune to the channel 124.
5. Adjust VOLUME to minimum (0).
6. Press VOL → (decrease) on receiver. Red “CHK” appears in upper corner.

To toggle between aging and service modes:

While the “CHK” is displayed on the left top corner of the CRT, pressing “ACTION” and “VOL” UP on the TV simultaneously will toggle between the modes. Red “CHK” for service and yellow “CHK” for aging.

7. Press **POWER** on the remote control to display the service adjustment modes menu, select adjustment by pressing the volume right/left buttons and channel up/down buttons on the remote and **ACTION** to enter the adjustment.

MTS CLOCK VIDEO	MTSIN CLOCK COLOR B-Y_G BRT	SEPAL TINT CUT_G R-DR H POS	SEPAH BRIGH CUT_R B-DR	HHSTH CONT CUT_B
HDEF				
VDEF	VEAMP	V-C	V-S	VPOS
SETID	ID1	ID2	ID3	

Exiting the service mode:

This TV goes out from service mode when it is unplugged or turned OFF. To exit the service mode, turn the TV OFF from or unplug the TV from A.C.

Other method

Press **ACTION** and **POWER** on the receiver simultaneously for at least 2 seconds.

The receiver momentarily shuts off; then comes back on tuned to channel 3 with a preset level of sound.

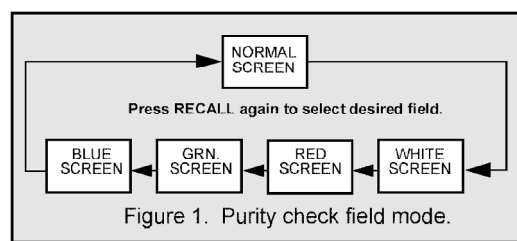
Any programmed channels, channels caption data and some others user defined settings will be erased when exited by pressing **ACTION** and **POWER** on receiver.

IMPORTANT NOTE

Always check that the TV exits the service mode.

To confirm colors

When in service mode (red "CHK" is displayed) press **RECALL** on the remote control to enter the purity field check mode



Entering service mode (open-back method)

While the receiver is connected and operating in normal mode, momentarily short test point FA1 (TP1 pin 2) to cold ground (TP1 pin 3).

The receiver enters the aging mode.

Yellow letters "CHK" appear in the upper left corner of the screen. / (The volume right/left and channel up/down will adjust rapidly).

Note:

If service mode is accessed by this method be sure to reset the set after service is performed.

12.1. Service adjustment default values for items

NAME	DESCRIPTION	ADDRESS	REGISTER VALUE		
			CT-20G8G/ SG	CT-20L8G	CT-25L8G/ UG
MTSIN	MTS INPUT LEVEL	A4 01	25	25	25
SEPAL	MTS LOW LEVEL SEPARATION	A4 02	08	08	08
SEPAH	MTS HIGH LEVEL SEPARATION	A4 03	1D	1D	1D
CLOCK	CLOCK	A4 04	128	128	128
HHSTH	HHS VOLTAGE LEVEL REFERENCE	A4 05	9D	9D	89
COLOR	COLOR	A4 06	01 15	01 15	01 15
TINT	TINT	A4 08	56	56	56
BRIGH	SUB-BRIGHTNESS	A4 09	4E	4E	40
CONT	SUB-CONTRAST	A4 0A	38	38	60
B-Y_G	MAGENTA TINT ADJ	A4 0B	80	80	80
CUT_G	GREEN CUT-OFF	A4 0C	01 C3	01 C3	02 05
CUT_R	RED CUT-OFF	A4 0E	02 0E	02 0E	02 9B
CUT_B	BLUE CUT-OFF	A4 10	01 5B	01 5B	01 F4
BRT	BRIGHT	A4 12	4E	4E	40
R-DR	RED DRIVE	A4 13	09 00	09 00	08 86
B-DR	BLUE DRIVE	A4 15	09 00	09 00	07 ED
H-POS	HORIZONTAL POSITION	A4 18	82	82	73
VEAMP	VERTICAL SIZE	A4 29	9B	9B	9C
V-C	VERTICAL LINEARITY	A4 2A	4C	4C	4C
V-S	VERTICAL SIZE CORRECTION	A4 2B	00	00	00
VPOS	VERTICAL POSITION	A4 FF	7C	7C	77
ID1*	ID SWITCH 1	A4 E9	88	70	70
ID2*	ID SWITCH 2	A4 EA	06	06	06
ID3*	ID SWITCH 3	A4 EB	30	30	30

IMPORTANT:

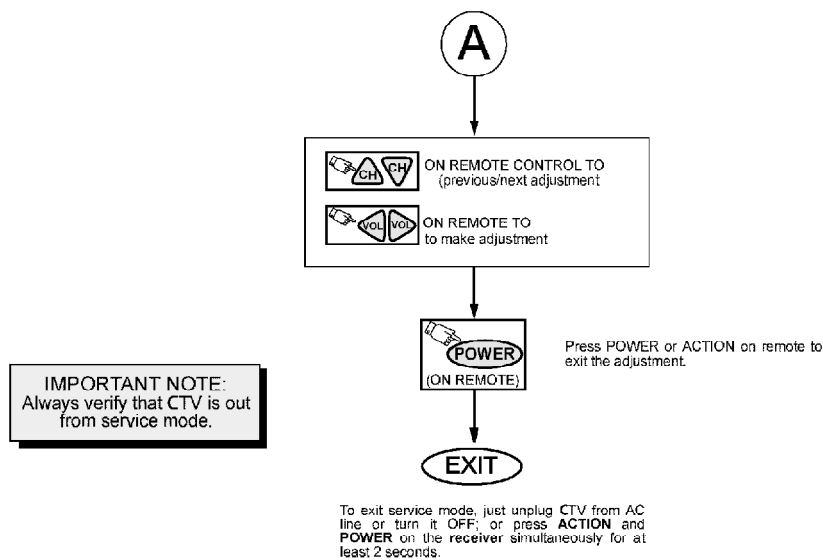
These table values are approximated and could change due to

variation of electrical characteristics in each set, except for the ID switch values.

***Note:**

The correspondent ID switch (ID1, ID2, ID3) data configuration should not be modified in any way. If EEPROM circuit needs to be replaced, these ID values should be configured according with this table.

12.2. Instructional Flow Chart for Service Mode



13. Service adjustments (electronic controls)

NOTE

Please correlate with available pattern on all adjustments

13.1. Sub-Brightness and Contrast / Service DAC adjustment (BRIGH, CONT)

Adjustment of this control is important for setting proper operation of customer brightness and picture controls. Do not adjust the SCREEN VR after the sub-brightness is set.

This adjustment is factory set. Do not adjust unless repairs are made to associated circuit, the CRT Board or when the CRT is replaced.

Preparation

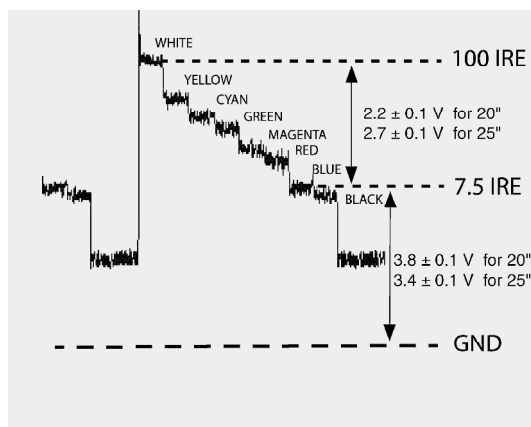
1. Apply a colorbar pattern.
2. Set the PICTURE control to the maximum.
3. Set COLOR control to minimum (no color on picture).
4. Set the BRIGHTNESS control to the center.
5. Set the SHARPNESS control to the center.
6. Connect the oscilloscope to TP35.

Procedure

1. In the service mode, select DAC for brightness adjustment

“BRIGH”, and adjust data to obtain $3.8 \pm 0.1V$ (for 20” CRT) or $3.4 \pm 0.1V$ (for 25” CRT) between 7.5IRE and GND level at TP35. (See waveformdetail).

2. In service mode, select DAC for contrast adjustment “CONT”, and adjust data to obtain $2.2 \pm 0.1V$ (for 20” CRT) or $2.7 \pm 0.1V$ (for 25” CRT) between 7.5IRE and 100IRE level at TP35. (See waveform detail)



13.2. Color output adjustment / Service DAC adjustment (COLOR, TINT)

NOTE

if a rainbow pattern generator is available perform the following procedure; the next section describes the procedure with no rainbow pattern.

Make sure that sub-contrast adjustment was finished prior to perform this adjustment.

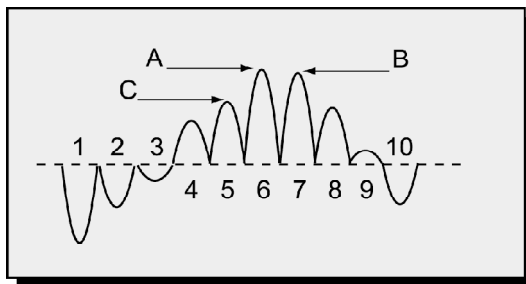
PREPARATION

1. Normalize the picture settings.
2. Set the BRIGHTNESS control to minimum.
3. Set the COLOR control to the center.
4. Set the TINT control to the center.
5. Set the PICTURE control to the maximum.
6. Set the SHARPNESS control to the minimum.

PROCEDURE

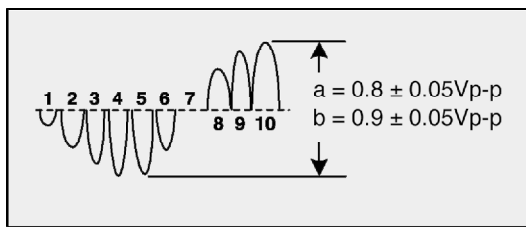
1. Apply a rainbow color bar pattern.
2. Connect the oscilloscope to TP37.
3. In service mode adjust “TINT” register until the waveform measured is as the one shown. Tint level from A and B peaks must be almost in the same level (0.3 Vp for 20” models and 0.35 Vp for 25” models).

TP37 Waveform.



4. Connect the oscilloscope to TP35 and GND.
5. Adjust “COLOR” register so that the amplitude “a” is $0.8 \pm 0.05 \text{Vp-p}$ for 20” models and amplitude “b” $0.9 \pm 0.05 \text{Vp-p}$ for 25” models.

TP35 Waveform.



13.3. Color output adjustment / Service DAC adjustment / (COLOR, TINT, B-Y_G)

NOTE

Color and tint adjustment sets the reference settings for the user controls; It is important to read the procedures.

(NO RAINBOW PATTERN)

Make sure that sub-contrast adjustment was finished prior to perform this adjustment

PREPARATION

Normalize the picture settings.

PROCEDURE

1. Apply a color bar pattern.
2. In service mode adjust “R DR” and “B DR” data to “80”.
3. In service mode adjust “TINT” data so that the color does not become greenish or redish.
4. In service mode adjust “COLOR” data so that the color level is not too high (saturated) or too low (tending to black and white).
5. In service mode adjust “B-Y G” data so that blue and green seem natural.
6. Confirm that saturation and picture are normal (normal image).
7. If image is not satisfactory, repeat adjustment until the image is normal and natural.

NOTE

The image can be compared against other set to see the image quality.

13.4. Color temperature adjustment / (B/W Tracking) / Service DAC Adjust. / (CUT R) (CUT G) (CUT B) (R DR) (B DR)

Minor Touch-Up Method

OBSERVE low and high brightness areas of a B/W picture for proper tracking. Adjust only as required for “good gray scale and warm highlights”.

1. **LOW LIGHT areas** - In service mode for making electronic adjustments, select CUT R, CUT G, CUT B and adjust the picture for gray.
2. **HIGH LIGHT areas** - In service mode for making electronic adjustments, select drive R DR, B DR and adjust the picture for warm whites.

Complete adjustment

PREPARATION

1. Turn the receiver “ON” and allow 30 minutes warm up at WHITE

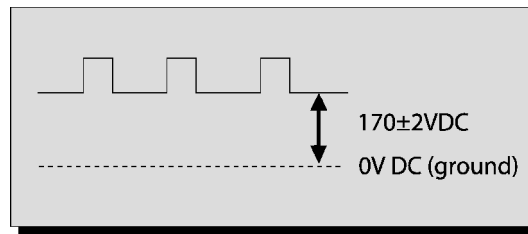
PATTERN.

- 2. Apply a color bar pattern (with no color).**
- 3. Turn the SCREEN control (part of FBT T551) fully counterclockwise.**
- 4. Preset the following service DACs for best results:**

- BRIGH	1 D0
- CUT R	02 00
- CUT G	02 00
- CUT B	02 00
- R DR	07 FF
- B DR	07 FF

PROCEDURE

- 1. Connect the oscilloscope to KG (CRT-Board).**
- 2. In service mode for making electronic adjustment, select “BRIGH” DAC.**
- 3. Press RECALL button on the remote control to collapse the raster. (service SW).**
- 4. Connect oscilloscope to KG on C-Board and adjust service mode “CUT-G” DAC until $170\pm 2V$ above DC ground is measured**
- 5. Remove the probe from KG.**
- 6. Turn screen clockwise slowly until color is slightly appeared.**
- 7. Then adjust “CUT R” and “CUT B” until line becomes white.**
- 8. Press RECALL button on the remote to restore the raster.**
- 9. Adjust “R DR” and “B DR” so the white seems like white and black like black.**
- 10. Apply a normal signal and confirm that the image is normal and a good gray scale**
- 11. If correction is needed perform minor touch-up method.**



13.5. Deflection adjustments

To reset deflection adjustments

To reset deflection adjustments to factory adjusted default, enter to service mode (with red CHK displayed), press **POWER** button on remote to display the service menu, then press and hold **RECALL** button for at least three seconds, a reset message will appear in the image.

Use this feature when deflection adjustment gets off adjustment to the point that it cannot be adjusted back easily.

13.5.1. H-Center adjustment

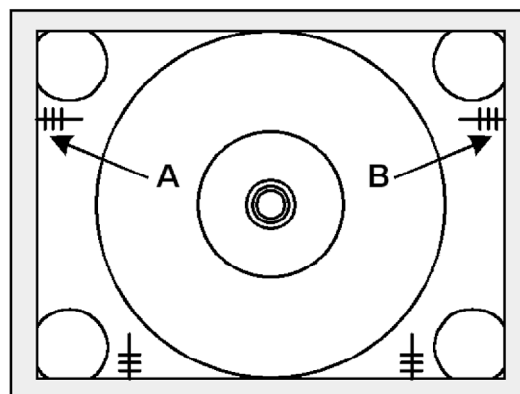
PREPARATION

1. Apply a crosshatch pattern.
2. Normalize the picture settings.

PROCEDURE

1. Apply a monoscope pattern to center the picture.

Horizontal Center Adjustment



2. If the horizontal center is not aligned, in service mode adjust “H POS” DATA to adjust the horizontal center of the monoscope pattern to the CRT center.

3. Verify that horizontal width (A & B mark) is within 4.5 ± 0.7 for 20" models and 5.0 ± 0.7 for 25" models.

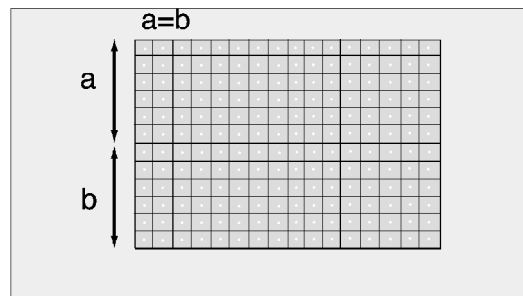
13.5.2. Vertical linearity(V-C), V-Size and V-Position adjustment

PREPARATION

1. Apply a crosshatch pattern
2. Normalize the picture settings.

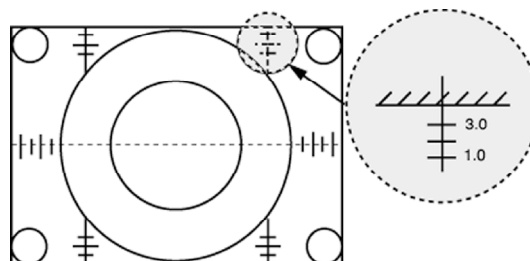
PROCEDURE

1. Enter service mode, select DAC adjustment / "V-POS" and adjust monoscope pattern to the center vertical position of the CRT center mark.
2. Adjust linearity data "V-C" so that interval of "a" is same as "b" (a= b).



3. If the v-position is not at the CRT center, adjust / V position "V POS" DATA again.
4. Apply a monoscope pattern.
5. Confirm that center horizontal line is in center mark on CRT.
6. Adjust "VEAMP" register for correct vertical size by making monoscope round circle leaving 4 marks off the CRT edge.

Vertical centering adjustment.



13.5.3. V-S Correction adjustment

PREPARATION

1. Apply a crosshatch pattern
2. Normalize the picture settings.

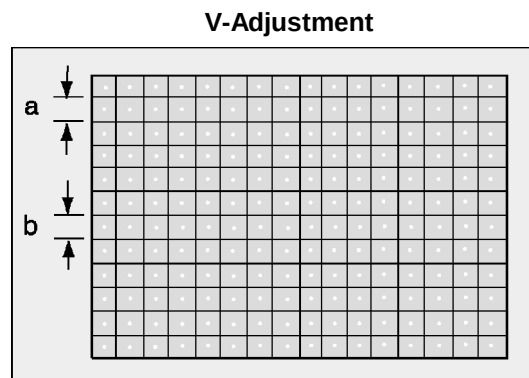
PROCEDURE

1. Enter to service mode
2. Check a and b sizes, If $b-a < -1.5\text{mm}$ (in top & bottom extending case)
 - Increase “V-S” DATA by one step

NOTE

Repeat “a” and “b” until $b-a \pm 1.5\text{mm}$

3. Confirm to make outermost circle of monoscope pattern a correct circle



13.6. MTS circuit adjustments

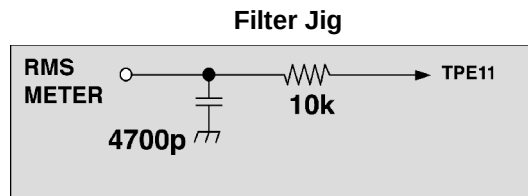
The MTS circuit adjustments require two steps:

1. Input level adjustment.
2. Stereo separation adjustment.

Input level adjustment / Service DAC adjustment (MTSIN)

PREPARATION

1. Connect an RMS meter with filter jig as shown in figure to TPE11.



2. Connect an RF signal generator to the RF antenna input.

PROCEDURE

1. Apply the following signal from the RF signal generator:
 - Video: 100 IRE flat field, 30% modulation.
 - Audio: 300Hz, 100% modulation, monaural (70 ±5dB, 75 Ω OPEN, P/S 10dB). Make sure that the 75 μ s pre-emphasis is OFF.
2. Adjust the MTS input level adjustment “MTSIN” data until the RMS voltage measured is 106 ± 6.0mVrms.

Stereo separation adjustment (SEPAH)

PREPARATION

1. Connect an R.F. signal generator to the RF antenna input.
2. Connect a scope to TPA20.

PROCEDURE

1. Select stereo mode in audio menu
2. Apply the following signal from the RF signal generator:
 - Video: 100 IRE flat field, 30% modulation.
 - Audio: 300Hz, 30% modulation, stereo (left only) (70±5dB, 75 Ω

OPEN, P/S 10dB).

NOTE

After setting 30% modulation with P.L. SW and N.R. SW OFF, turn P.L. SW and N.R. SW ON.

- 3. In service mode, adjust the MTS Low-Level separation adjustment “SEPAL” data until the amplitude displayed on the scope is minimum.**
- 4. Apply the following signal from the RF signal generator:**
 - Video: 100 IRE flat field, 30% modulation**
 - Audio: 3KHz, 30% modulation, stereo (left only) (70 ±5dB, 75 Ω OPEN, P/S 10dB).**

NOTE

After setting 30% modulation with P.L. SW and N.R. SW OFF, turn P.L. SW and N.R. SW ON.

- 5. Adjust the MTS High-level separation adjustment “SEPAH” until the amplitude displayed on the scope is minimum.**
- 6. Repeat above steps 2 through 5 until the amplitude is at minimum for both signals.**

13.7. Clock adjustment (CLOCK)

PREPARATION

Connect the frequency counter from TP017 / (IC001 pin 79) to cold ground

PROCEDURE

- 1. Turn the receiver “OFF” with the A.C. power applied.**
- 2. Measure TP017 (IC001 pin 79) for the frequency of the waveform and record the reading.**

NOTE

- 3. TP017 (IC001 pin 79) measurement must have at least four digits**

of resolution following the decimal point. Example: 000.0000

4. Place the receiver into service mode for making electronic adjustment, select the clock adjustment DAC "CLOCK".

5. Calculate and set "CLOCK" based on the following formula:

$$\text{CLOCK} = 128 - \left[\frac{(\text{TP017}_{freq} - 610.35)}{610.35} \times 450000 \right]$$

NOTE

TP017 (IC001 pin 79) measurement will not change regardless of the value stored in CLOCK.

13.8. Service Adjustments Mechanical Controls

WIDTH CORRECTION ADJUSTMENT

Note

Perform this adjustment only when FBT is changed.

FOCUS (PART OF T551)

Preparation

Apply a crosshatch pattern with dots.

Procedure

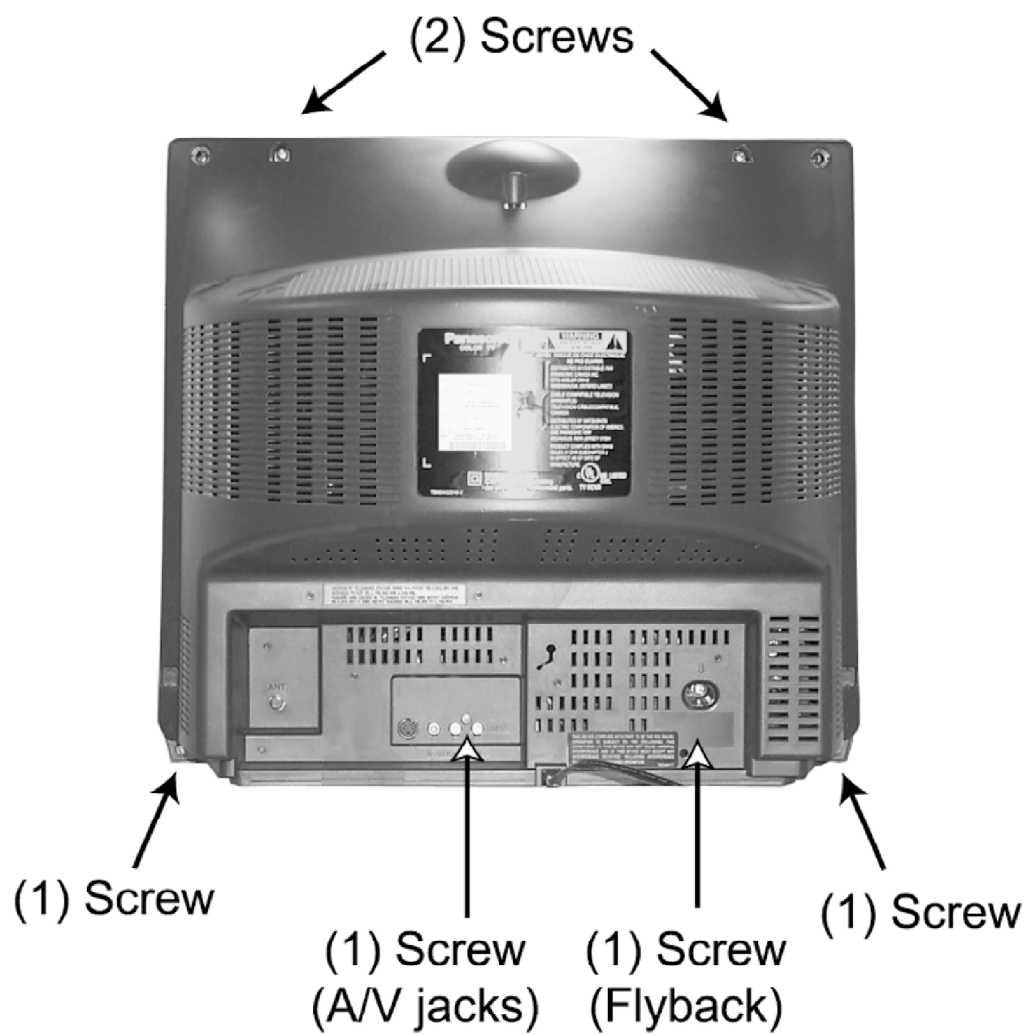
1. Adjust the FOCUS VR to obtain the sharpest and clearest dot pattern.

- Adjust for best center.
- Adjust for best area between the center and top right corner.

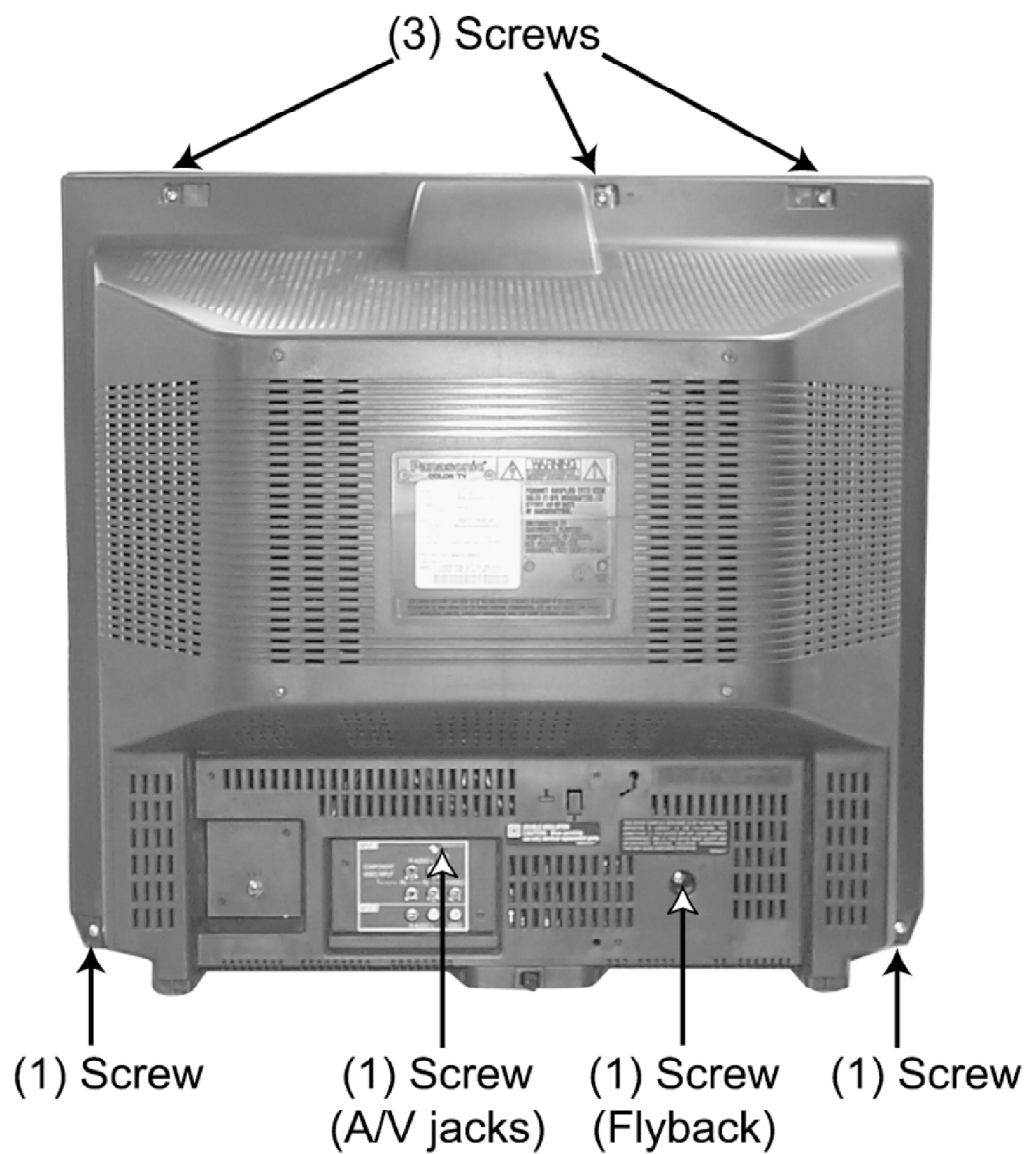
14. Identification of Components

14.1. Back Cover Removal

Back Cover Removal (CT-20G8G/CT-20G8SG/CT-20L8G).

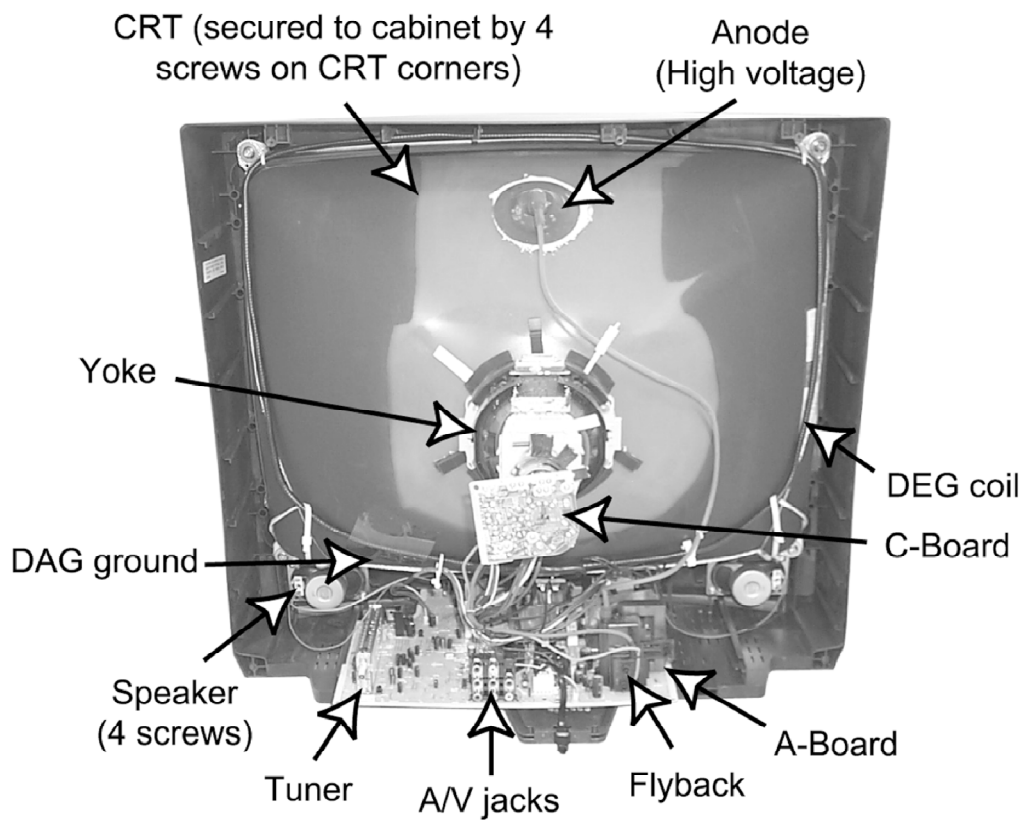


Back Cover Removal (CT-25L8G/CT-25L8UG).



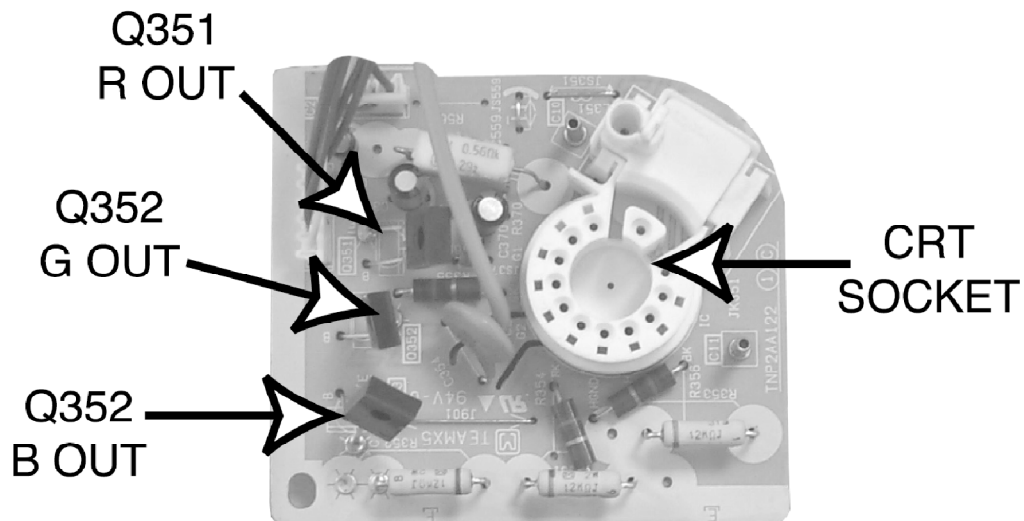
14.2. Chassis Components

Rear view (inside cabinet).



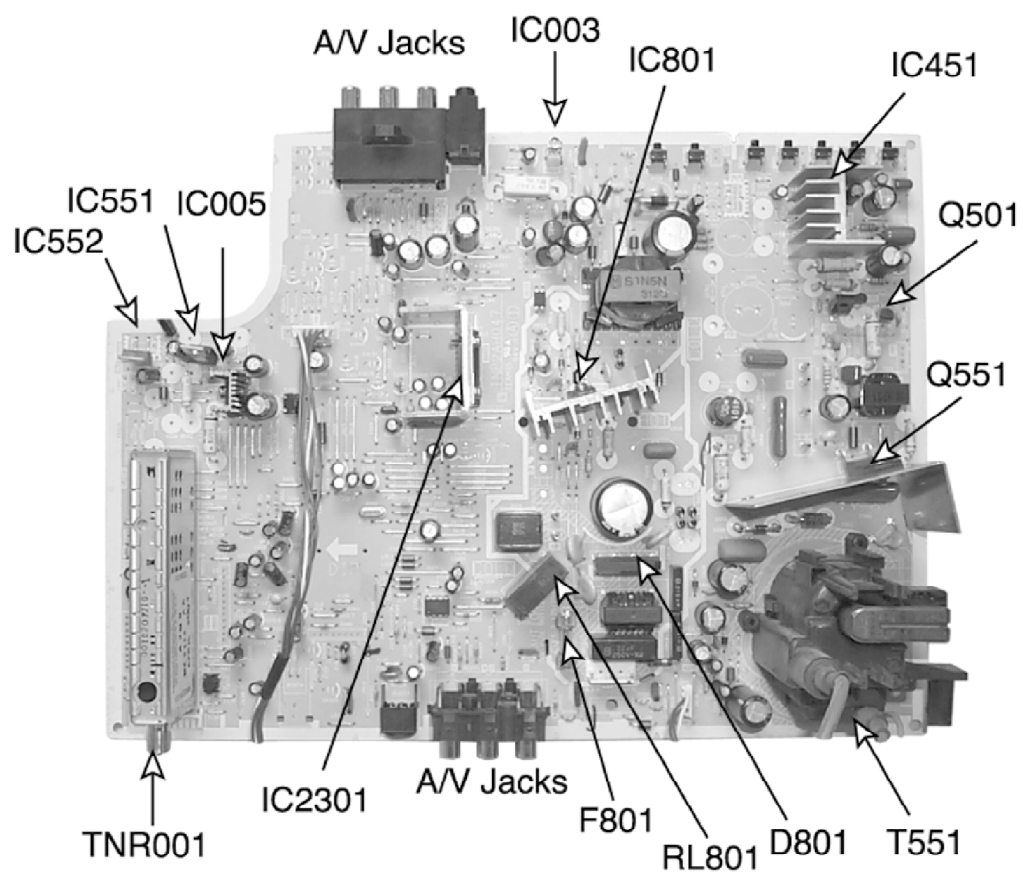
14.2.1. C-Board Chassis

C-Board component locations



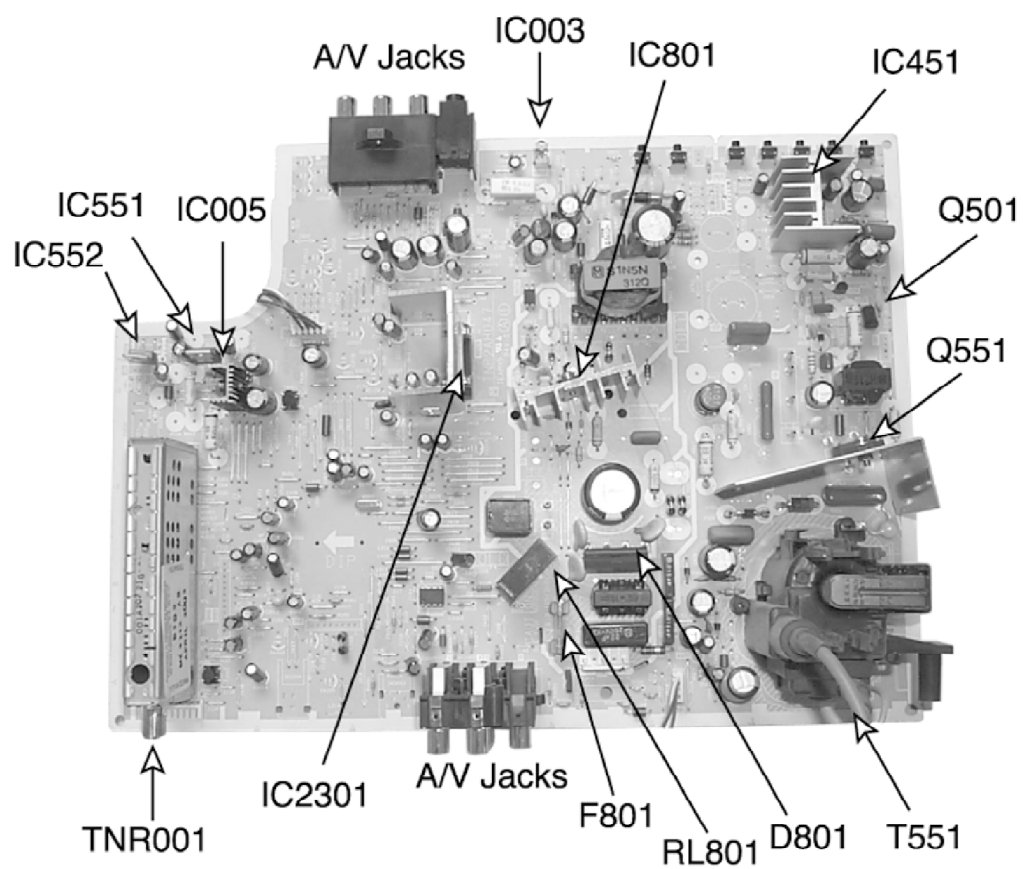
14.2.2. CT-20G8G/CT-20G8SG A-Board Chassis

A-Board Top view (CT-20G8G/CT-20G8SG).



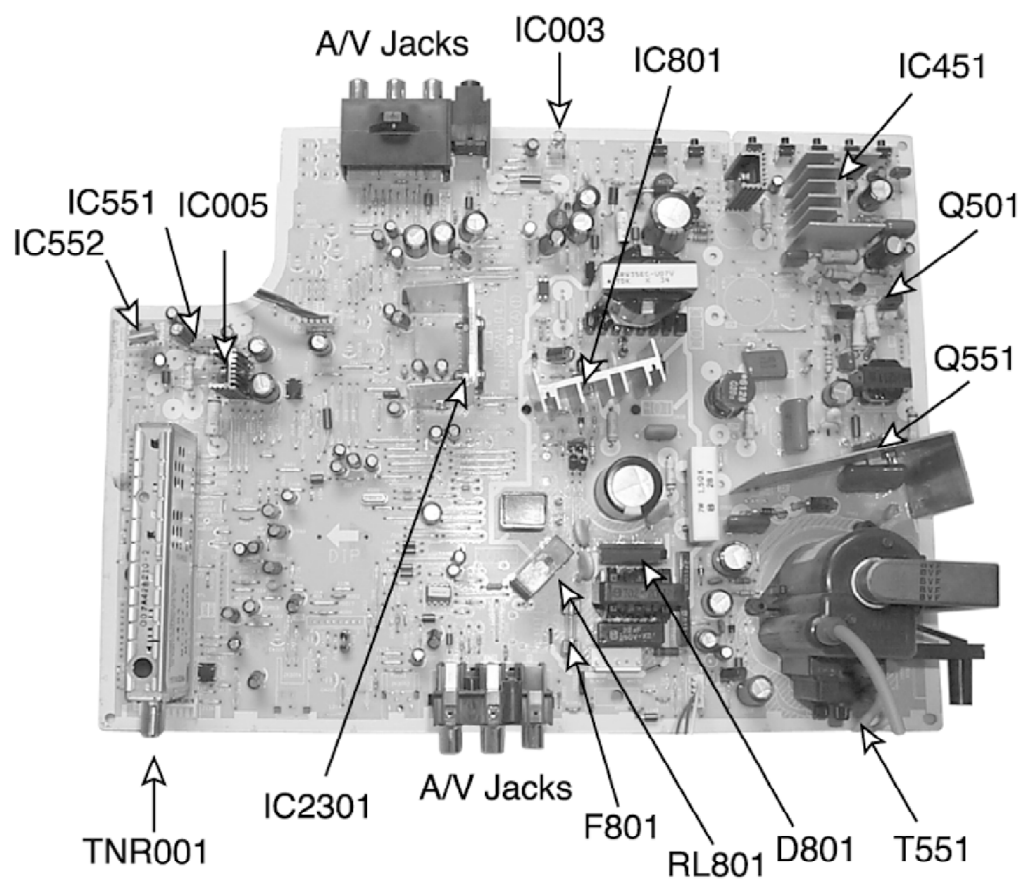
14.2.3. CT-20L8 A-Board Chassis

A-Board Top view (CT-20L8G)



14.2.4. CT-25L8/CT-25L8U A-Board Chassis

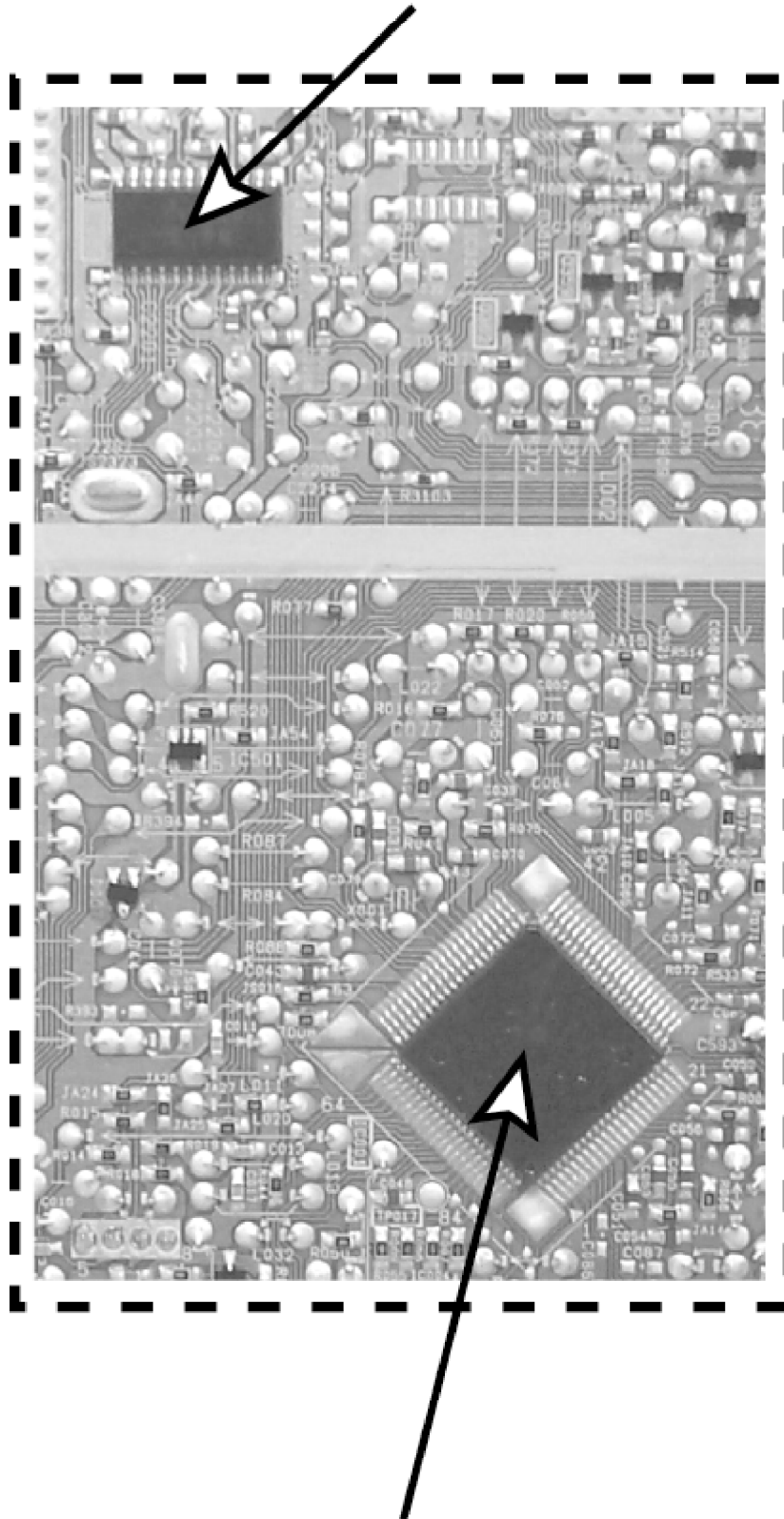
A-Board Top view (CT-25L8G/CT-25L8UG).



14.2.5. A-Board Surface-mounted components

A-Board (bottom view)

IC2201



IC001

15. Reference for PDF Colors

DESCRIPTION OF PDF LINK COLORS	
TYPE	DESTINATION
SCHEMATIC	
YELLOW ON IC	IC ON PCB
YELLOW ON CONNECTOR	CONNECTOR ON PCB
YELLOW ON SCHEMATIC	PCB
CYAN	WAVEFORM
GREEN ON SIDE	SCHEMATIC CONTINUED
GREEN ON CONNECTOR	CONNECTOR CONNECTION
BLUE ON IC	VOLTAGE
PCB	
BLUE ON IC	IC ON SCHEMATIC
BLUE ON CONNECTOR	CONNECTOR ON SCHEMATIC
BLUE ON PCB	SCHEMATIC
GREEN ON SIDE	PCB CONTINUED
BLOCK DIAGRAMS	
GREEN ON IC	IC ON SCHEMATIC
GREEN ON SIDE	BLOCK DIAGRAM CONTINUED

16. Conductor Views

16.1. A-Board Printed Circuit (Left Side)

16.2. A-Board& C Board Printed Circuit (Right Side)

17. Block Diagrams

17.1. Video Signal Block Diagram

17.2. Audio Signal Block Diagram

18. Schematics

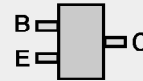
18.1. English Schematic Notes

Notes:

IMPORTANT SAFETY NOTICE

THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES THAT ARE IMPORTANT FOR PROTECTION FROM X-RADIATION, FIRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFACTURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS DESIGNATED WITH A Δ IN THE SCHEMATIC.

CHIP TRANSISTOR LEAD DESIGNATION



SCHEMATIC NOTES

- Resistors are carbon 1/4W unless noted otherwise.
 - Capacitors are ceramic 50V unless noted otherwise.
 - Coil value notes is inductance in μ H.
 - Test point indicated by $\uparrow$; Test point but no pin $\uparrow$.
 - Components indicated with Δ are critical parts and replacement should be made with manufacture specified replacement parts only.
 - (**BOLD LINE**) indicates the route of B+ supply.
 - The schematic diagrams are current at the time of printing and are subject to change without notice.
 - Ground symbol $\downarrow$ indicates **HOT GROUND CONNECTION**; $\rceil$ indicates COLD GROUND.
- NOTE: All other component symbols are used for engineering design purposes.*

VOLTAGE MEASUREMENTS

- Voltage measurement:
 - AC input to the Receiver is 120V. NTSC (HD, 1125i & 525P when applicable) signal generator is connected to the antenna of the Receiver. (Color bar pattern of 100 IRE white and 7.5 IRE black.)
 - All Picture and Audio adjustments are set to Normalize.
TV ANT/CABLE - (Set-Up Menu) in TV/ANT Mode
Volume - Min.
TV/Video SW - TV position
Audio Mode - Stereo
 - Voltage readings are nominal and may vary $\pm 10\%$ on active devices. Some voltage reading will vary with signal strength and picture content.
 - Supply voltages are nominal.
 - Ground symbol $\downarrow$ indicates ground lead connection of meter.
Incorrect ground connection will result in erroneous readings.
- CAUTION: Incorrect ground connection of the test equipment will result in erroneous readings.**

WAVEFORM MEASUREMENTS

- $\textcircled{3}$ indicates waveform measurement. (Measurement can be taken at the best accessible location in common to the indicated point.)
 - Taken with an NTSC signal generator connected to the antenna terminal. (NTSC color bar pattern of 8 bars of EIA colors, 100 IRE white and 7.5 IRE black.)
 - Customer Controls (Picture/Audio Menu) are set to Normalize. Volume is set to "MIN".
 - All video and color waveforms are taken with a wideband scope and a probe with low capacitance (10 to 1). Shape and peak altitudes may vary depending on the type of Oscilloscope used and its settings.
 - Ground symbol $\downarrow$ shown on waveform number indicates (Hot) ground lead connection of the Oscilloscope.
- CAUTION: Incorrect ground connection of the test equipment will result in erroneous readings.**



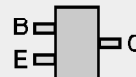
18.2. Notas de Esquemáticos en Español

Notas

NOTA DE SEGURIDAD

LOS DIAGRAMAS ELÉCTRICOS INCLUYEN CARACTERÍSTICAS ESPECIALES MUY IMPORTANTES PARA LA PROTECCIÓN CONTRA RAYOS-X, QUEMADURAS Y DESCARGAS ELÉCTRICAS. CUANDO SE DE SERVICIO ES IMPORTANTE USAR PARA REEMPLAZO DE COMPONENTES CRÍTICOS, SOLO PARTES ESPECIFICADAS POR EL FABRICANTES. LOS COMPONENTES CRÍTICOS ESTAN SEÑALADOS EN LOS DIAGRAMAS POR EL SIMBOLO .

IDENTIFICACIÓN DE TERMINALES PARA TRANSISTORES EN CHIP



NOTAS DE LOS DIAGRAMAS

- Las Resistencias son de Carbón de 1/4W, a menos que se indique otra característica.
 - Los Capacitores son de Cerámica para 50V, a menos que se indique otra característica.
 - El valor indicado de las Bobinas es la inductancia expresada en μH .
 - Los puntos de prueba en la terminal de algún componente son indicados por . Los puntos de prueba fuera de los componentes se indican con .
 - Los componentes señalados con el símbolo  son considerados componentes críticos y deben ser reemplazados sólo con las partes especificadas por el fabricante.
 -  (LINEA GRUESA) indica las líneas de alimentación de los Voltajes B+.
 - Los diagramas eléctricos están sujetos a cambio sin previo aviso.
 - El símbolo  indica que es una conexión a **Tierra Caliente** y el símbolo  indica conexión a **Tierra Fría**.
- NOTA:** Los demás símbolos de componentes incluidos son usados con fines de diseño.

MEDICIÓN DE VOLTAJES

- Medición de voltaje:
 - El voltaje de entrada al Receptor es de 120V de Corriente Alterna. Un generador de patrones con formato NTSC se conecta a la entrada de la antena. (Patrón de Barras de Colores con 100 IREs para el Blanco y 7.5 IREs para el Negro.)
 - Los ajustes de los Menus Picture y Audio se normalizan. En el Menú Set-Up, en la opción ANTENA, se selecciona el modo de CABLE. El nivel de Volumen se minimiza. De los modos TV y Video, seleccionar el modo TV. Seleccionar modo Estereo del Audio.
 - Las mediciones de los voltajes son nominales y pueden variar hasta 10% en componentes en funcionamiento. Las lecturas de los voltajes pueden variar por la potencia de la señal y el contenido de la imagen.
 - Las fuentes de voltajes son nominales.
 - El símbolo  indica el tipo de tierra que se utiliza en la conexión del medidor.
- PRECAUCION:** Si no se utiliza la conexión a la tierra adecuada, se obtendrán mediciones equivocadas y podría dañar el equipo de medición.

MEDICIÓN DE FORMAS DE ONDA

- Un símbolo como  indica el punto para medir una señal. (La medición puede hacerse en el punto con mayor accesibilidad, siempre que sea común al indicado.)
 - Se midieron utilizando un generador con formato NTSC conectado a la terminal de la antena. (Patrón de 8 Barras de Colores EAI, formato NTSC de 100 IREs para el Blanco y 7.5 IREs para el Negro.)
 - Los ajustes de usuario de los Menus PICTURE y AUDIO se normalizaron. Posteriormente el nivel de volumen se ajusta al mínimo.
 - Las formas de onda de Video y Color fueron tomadas con un osciloscopio de banda alta y con un punta de prueba de baja capacitancia (10 a 1). La forma y amplitud de las ondas puede variar según el tipo de osciloscopio que se utilice y sus características.
 - El símbolo de tierra  que aparece junto al número de la forma de onda, indica que se utiliza conexión a **Tierra Caliente** en el extremo negativo de la punta de prueba.
- PRECAUCION:** Si no se utiliza la conexión a la tierra adecuada, se obtendrán mediciones equivocadas y podría dañar el equipo de medición.

18.3. A-Board Schematic TNP2AH047AA/AB (page 1 of 4)

18.4. A-Board Schematic TNP2AH047AA/AB (page 2 of 4)

18.5. A-Board Schematic TNP2AH047AA/AB (page 3 of 4)

18.6. A-Board Schematic TNP2AH047AA/AB (page 4 of 4)

18.7. A-Board Schematic TNP2AH047FA (page 1 of 4)

18.8. A-Board Schematic TNP2AH047FA (page 2 of 4)

18.9. A-Board Schematic TNP2AH047FA (page 3 of 4)

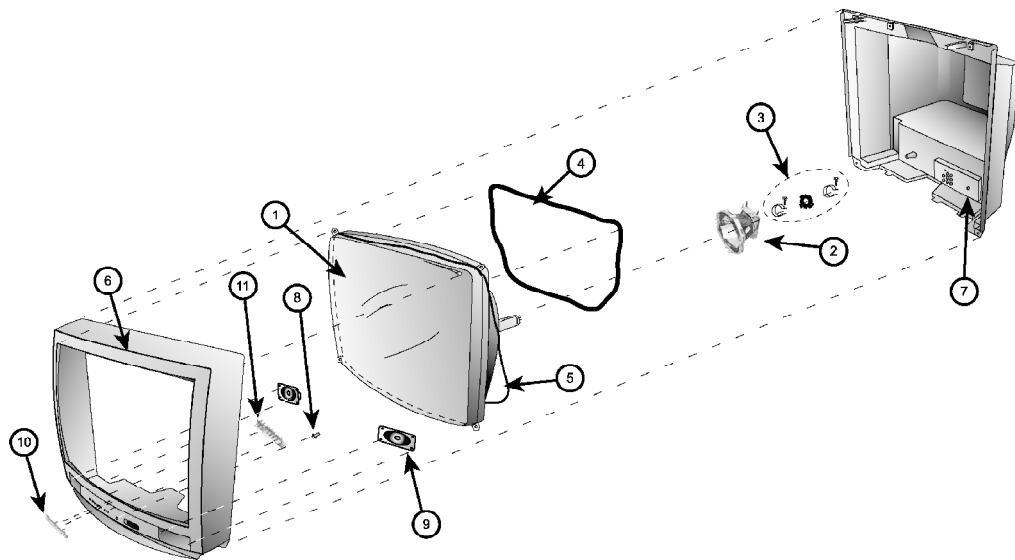
18.10. A-Board Schematic TNP2AH047FA (page 4 of 4)

18.11. C-Board Schematic TNP2AA122AA/FA

18.12. Voltages

18.13. Waveforms

19. Parts Location



20. Parts List

20.1. Parts List Notes

Important Safety Notice

Components identified by  mark have special characteristics important for safety.
When replacing any of these components, use manufacturer's specified parts.

Abbreviation of part name and description

1. Resistor

Example :

ERD25TJ104 **C** 100K Ω , **J**, 1/4W
Type Allowance

Type	Allowance
C : Carbon	F : $\pm 1\%$
F : Fuse	G : $\pm 2\%$
M : Metal Oxide Metal Film	J : $\pm 5\%$ K : $\pm 10\%$
S : Solid	M : $\pm 20\%$
W : Wire Wound	

2. Capacitor

Example :

ECKF1H103ZF **C** 0.01 μ F, **Z**, 50V
Type Allowance

Type	Allowance
C : Carbon	C : $\pm 0.25\mu$ F
E : Electrolytic	D : $\pm 0.5\mu$ F
P : Polyester Polypropylene	F : $\pm 1\mu$ F G : $\pm 3\%$
T : Tantalum	J : $\pm 5\%$ K : $\pm 10\%$ L : $\pm 15\%$ M : $\pm 20\%$ P : $\pm 100\%$, -0% Z : $\pm 80\%$, -20%

20.2. Parts List

Ref. No.	Part No.	Part Name & Description	Remarks
CAPRISTORS			
CRA801	TP00842-51	TAPING GAP TERMINAL	
CAPACITORS			
C003	ECA1HM4R7B	CAP E 4.7UF-50V	
C004	TCJ2VC1H150J	CAP C 15PF-J-50V	
C005	TCJ2VC1H150J	CAP C 15PF-J-50V	
C008	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C009	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C010	TCJ2VC1H680J	CAP C 68PF-J-50V	
C011	TCJ2VC1H680J	CAP C 68PF-J-50V	
C012	ECA1HM0R1B	CAP E 0.1UF/50V	
C013	TCJ2VC1H680J	CAP C 68PF-J-50V	
C016	ECA1AM101B	CAP E 100UF-10V	
C017	TCJ2VC1H680J	CAP C 68PF-J-50V	
C018	ECJ2VF1H103Z	CAP C .01UF-Z-50V / CT-20G8G CT-20G8SG CT-20L8G	
C018	TCJ2VF1H103Z	CAP C .01UF-Z-50V / CT-25L8G CT-25L8UG	
C019	ECA0JM102B	CAP E 1000UF-6.3V	
C020	ECA1CM102B	CAP E 1000UF/16V	
C021	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C031	TCJ2VC1H220J	CAP C 22PF-J-50V	
C032	ECA1AM470B	CAP E 47UF-10V	
C034	TCJ2VC1H390J	CAP C 39PF-J-50V	
C035	TCJ2VC1H120J	CAP C 12PF-J-50V	
C038	ECA1CM470B	CAP E 47UF/16V	

Ref. No.	Part No.	Part Name & Description	Remarks
C039	TCJ2VB1H221K	CAP C 220PF-K-50V	
C041	ECA1HM2R2B	CAP E 2.2UF-50V	
C043	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C044	ECA0JM102B	CAP E 1000UF-6.3V	
C046	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C048	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C051	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C052	ECA1CM101B	CAP E 100UF/16V	
C053	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C054	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C055	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C056	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C057	ECEA1CN100UB	CAP E 10UF-16V	
C058	ECEA1CN100UB	CAP E 10UF-16V	
C059	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C060	ECEA1CN220UB	CAP E 22UF-16V	
C061	ECA1HM100B	CAP E 10UF/50V	
C062	ECA1HM100B	CAP E 10UF/50V	
C063	ECJ2VF1C104Z	CAP C .1UF-Z-16V	
C064	ECA1CM101B	CAP E 100UF/16V	
C066	TCJ2VC1H330J	CAP C 33PF-J-50V	
C067	TCJ2VC1H680J	CAP C 68PF-J-50V	
C068	ECA1CM100B	CAP E 10UF-16V	
C070	ECJ2VF1C104Z	CAP C .1UF-Z-16V	
C071	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C072	TCJ2VB1H221K	CAP C 220PF-K-50V	
C073	TCJ2VC1H101J	CAP C 100PF-J-50V	
C077	ECA1HM100B	CAP E 10UF/50V	
C079	TCJ2VC1H220J	CAP C 22PF-J-50V	
C083	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C085	ECJ2VB1C104K	CAP C .1UF-K-16V	
C350	ECA1CM101B	CAP E 100UF/16V	
C351	TCJ2VC1H101J	CAP C 100PF-J-50V / CT-20G8G CT-20G8SG CT-20L8G	
C351	TCJ2VC1H331J	CAP C 330PF-J-50V / CT-25L8G CT-25L8UG	
C352	TCJ2VC1H101J	CAP C 100PF-J-50V / CT-20G8G CT-20G8SG CT-20L8G	
C352	TCJ2VC1H331J	CAP C 330PF-J-50V / CT-25L8G CT-25L8UG	
C353	TCJ2VC1H151J	CAP C 150PF-J-50V / CT-20G8G CT-20G8SG CT-20L8G	
C353	TCJ2VC1H331J	CAP C 330PF-J-50V / CT-25L8G CT-25L8UG	
C354	ECKW3D102KBN	CAP C .001UF-K-2KVDC	
C357	EEANA1E1R0B	CAP E 1.0UF-25V	
C359	ECA1CM471B	CAP E 470UF-16V	
C360	ECA1HM4R7B	CAP E 4.7UF-50V	
C370	ECA1HM100B	CAP E 10UF/50V / CT-25L8G CT-25L8UG	
C403	ECEA1CN220UB	CAP E 22UF-16V	
C411	ECQB1H683JF3	CAP P .068UF-J-50V	
C451	ECA1HM2R2B	CAP E 2.2UF-50V	
C452	ECA1CM220B	CAP E 22UF-16V	
C454	ECA1VHG101B	CAP E 100UF-35V	
C455	ECA1EM102E	CAP E 1000UF-25V	
C458	ECA1HM010B	CAP E 1UF-50V	
C459	ECA1VHG471E	CAP E 470UF-35V	
C460	ECQB1224KF3	CAP P .22UF-K-100V	
C461	ECQB1104JF3	CAP P .10UF-J-100V / CT-25L8G CT-25L8UG	
C462	ECJ2VF1H103Z	CAP C .01UF-Z-50V	

Ref. No.	Part No.	Part Name & Description	Remarks
C501	ECCR1H221JC5	CAP C 220PF-J-50V	
C505	ECQB1H104JF3	CAP P .10UF-J-50V	
C506	ECKR2H102KB5	CAP C 1000PF-K-500V	
C510	ECCR2H100D5	CAP C 10PF-D-500V	
C512	ECA2CM100B	CAP E 10UF-160V	
C531	ECA1HM4R7B	CAP E 4.7UF-50V	
C540	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C551	ECA1VHG471B	CAP E 470UF-35V	
C554	ECKR2H561KB5	CAP C 560PF-K-500V	
C555	ECA2EM220E	CAP E 22UF-250V / CT-25L8G CT-25L8UG	
C555	ECA2EM470E	CAP E 47UF-250V / CT-20G8G CT-20G8SG CT-20L8G	
C556	ECA1CM471B	CAP E 470UF-16V	
C557	ECKR2H102KB5	CAP C 1000PF-K-500V / CT-25L8G CT-25L8UG	
C557	ECKR2H222KB5	CAP C 2200PF-K-500V / CT-20G8G CT-20G8SG CT-20L8G	
C560	ECQB1104JFW	OR ECQB1104JF3	
C561	ECEA1HN010UB	CAP E 1UF/50V	
C562	ECKR2H561KB5	CAP C 560PF-K-500V	
C563	ECWH12H362JS	CAP P 3600PF-J-1.2KV / CT-20G8G CT-20G8SG CT-20L8G	
C563	ECWH16622JVB	CAP P 6200PF-J-1.5KV / CT-25L8G CT-25L8UG	
C564	ECWH12H822JS	CAP P .0082UF-J-1.2KV / CT-25L8G CT-25L8UG	
C564	ECWH12H472JS	CAP P .0047UF-J-1.2KV / CT-20G8G CT-20G8SG CT-20L8G	
C565	ECKW3D561JBR	CAP P 560PF-J-2KV / CT-25L8G CT-25L8UG	
C565	ECKW3D821JBP	CAP C 820PF-J-2KV / CT-20G8G CT-20G8SG CT-20L8G	
C566	ECKW3D181JBP	CAP C 180PF-J-2KV	
C568	ECQM4473JZW	CAP P .047UF-J-400V / CT-20G8G CT-20G8SG CT-20L8G	
C568	ECWF2224JBB	CAP P .22UF-J-200V / CT-25L8G CT-25L8UG	
C569	ECWF2394JSR	CAP M .39UF-J-200V / CT-20G8G CT-20G8SG CT-20L8G	
C569	ECWF2474JSR	CAP P .47UF-J-200V / CT-25L8G CT-25L8UG	
C570	ECA1CM221B	CAP E 10UF-16V	
C571	ECA1CM220B	CAP E 22UF-16V	
C572	ECA0JM221B	CAP E 220UF-6.3V	
C573	ECA1CM101B	CAP E 100UF/16V	
C575	ECKR2H471KB5	CAP C 470PF-K-500V	
C593	ECA1CM470B	CAP E 47UF/16V	
C605	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C606	ECA0JM221B	CAP E 220UF-6.3V	
C800	ECKR3A152KBP	CAP C 1500PF-K-1KVDC	
C801	ECKWAE472ZED	CAP C 4700PF-Z-500V	
C802	ECKWAE472ZED	CAP C 4700PF-Z-500V	
C803	ECKWAE472ZED	CAP C 4700PF-Z-500V	
C805	EC0S2DA221BB	CAP E 220UF/200V / CT-20G8G CT-20G8SG CT-20L8G	
C805	EC0S2DA331BB	CAP E 330UF/200V / CT-25L8G CT-25L8UG	
C806	ECQM4103KZW	CAP P .01UF-K-400V	
C808	ECA1HM470B	CAP E 47UF-50V	
C809	ECKR1H102KB5	CAP C .001UF-K-50V / CT-25L8G CT-25L8UG	
C809	ECKR1H152KB5	CAP C 1500PF-K-50V / CT-20G8G CT-20G8SG CT-20L8G	
C810	ECKR1H471KB5	CAP C 470PF-K-50V	

Ref. No.	Part No.	Part Name & Description	Remarks
C812	ECQU2A224MVA	CAP P .22UF-M-250VAC	
C813	ECQU2A153MVA	CAP P .015UF-M-250VAC	
C814	ECQU2A153MVA	CAP P .015UF-M-250VAC	
C820	ECA1CM101B	CAP E 100UF/16V	
C821	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C822	ECKR3A221KBP	CAP C 220PF-K-1KV	
C823	ECA1VM471B	CAP E 470UF-35V	
C824	ECKR3A102KBP	CAP C 1000PF-K-1KV	
C825	EEUMG2C221S	CAP E 220UF-160V	
C826	ECKR3A471KBP	CAP C 470PF-K-1KV	
C827	ECA1CM102B	CAP E 1000UF/16V	
C828	ECA160V33UE	CAP E 33UF/160V	
C829	ECA1CM471B	CAP E 470UF-16V	
C830	ECA1CM471B	CAP E 470UF-16V	
C2201	ECA1HM4R7B	CAP E 4.7UF-50V	
C2202	ECA1HM2R2B	CAP E 2.2UF-50V	
C2203	ECA1HM4R7B	CAP E 4.7UF-50V	
C2204	AP106K016CAE	CAP T 10UF/16V	
C2205	ECA1HMR33B	CAP E .33UF-50V	
C2206	ECQB1H223JF3	CAP P .022UF-J-50V	
C2207	AP335K016CAE	CAP T 3.3UF/16V	
C2208	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2209	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2210	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2212	ECQB1H473JF3	CAP P .047UF-J-50V	
C2213	ECA1HMR47B	CAP E .47UF-50V	
C2214	ECA1AM101B	CAP E 100UF-10V	
C2215	EEANA1E100B	CAP E 10UF-25V	
C2216	TCJ2VC1H100D	CAP C 10PF-J-50V	
C2217	ECJ2VB1H102K	CAP C .001UF-K-50V	
C2218	ECJ2VB1H102K	CAP C .001UF-K-50V	
C2219	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2220	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2301	ECA1EM102E	CAP E 1000UF-25V	
C2302	ECA1HM010B	CAP E 1UF-50V	
C2304	ECA1CM101B	CAP E 100UF/16V	
C2307	ECA1CM102B	CAP E 1000UF/16V	
C2308	ECKR1H103ZF3	CAP C .01UF-Z-50V	
C2312	ECA1HM010B	CAP E 1UF-50V	
C2313	ECA1EM220B	CAP E 22UF-25V	
C2317	ECA1CM102B	CAP E 1000UF/16V	
C2350	ECA1CM101B	CAP E 100UF/16V	
C3001	ECA1CM220B	CAP E 22UF-16V	
C3002	ECA1CM220B	CAP E 22UF-16V	
C3011	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3012	ECA1HM010B	CAP E 1UF-50V	
C3013	ECA1CM100B	CAP E 10UF-16V	
C3014	ECA1CM100B	CAP E 10UF-16V	
C3018	ECA1HM010B	CAP E 1UF-50V	
C3019	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3025	ECA1HM100B	CAP E 10UF/50V	
C3234	ECA1CM470B	CAP E 47UF/16V	

Ref. No.	Part No.	Part Name & Description	Remarks
C3240	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
DIODES			
D001	MAZ30680ML	DIODE	
D002	MA2C165001VT	DIODE	
D003	MAZ30510HL	DIODE	
D006	MAZ33000HL	DIODE	
D007	MAZ30510HL	DIODE	
D010	MAZ40510MF	DIODE ZENER	
D055	MAZ40330MF	DIODE ZENER	
D360	MA2C165001VT	DIODE	
D380	MA2C029WBF	DIODE	
D451	B0EAKL000008	DIODE RECTIFIER	
D452	MA2C165001VT	DIODE	
D505	D1NL40V70	DIODE	
D531	MA2C165001VT	DIODE	⚠
D551	B0HAMM000072	DIODE FAST RECOVERY	⚠
D554	AU02V0	DIODE	⚠
D556	MA2C165001VT	DIODE	
D557	MAZ40270LF	DIODE ZENER	
D558	B0HANV000008	DIODE	
D559	EU2	DIODE	
D561	AU02V0	DIODE	⚠
D606	MA2C165001VT	DIODE	
D801	D3SBA60-4103	DIODE	⚠
D803	MAZ41200MF	DIODE ZENER	
D806	TAP2AA0003	PTC 3-OHM	⚠
D808	SARS01V1	DIODE	
D809	B0HAJP000015	DIODE	
D810	B0HAJP000015	DIODE	
D811	B0HAJP000015	DIODE	
D820	MA2C165001VT	DIODE	
D821	MAZ40470HF	DIODE ZENER	
D822	B0HAMM000103	DIODE	
D823	S3L60P154004	DIODE	⚠
D824	B0HAMM000072	DIODE FAST RECOVERY	
D2302	MAZ43000MF	DIODE ZENER	
D2305	CVS20A120MTA	DIODE	
D2307	CVS20A120MTA	DIODE	
D2350	MAZ40910LF	DIODE	
D2355	MAZ30510HL	DIODE	
D3001	MAZ40510MF	DIODE ZENER	
D3004	CVS20A120MTA	DIODE	
D3005	CVS20A120MTA	DIODE	
D3007	MAZ31100ML	DIODE ZENER	
D3008	MAZ31100ML	DIODE ZENER	
D3009	MAZ31100ML	DIODE ZENER	
D3010	MAZ31100ML	DIODE ZENER	
D3011	MAZ31100ML	DIODE ZENER	
D3012	MAZ31100ML	DIODE ZENER	
D3017	MAZ31100ML	DIODE ZENER	
D3018	MAZ31100ML	DIODE ZENER	
D3019	CVS20A120MTA	DIODE	

Ref. No.	Part No.	Part Name & Description	Remarks
D3021	CVS20A120MTA	DIODE	
D3023	MAZ31100ML	DIODE ZENER	
D3024	MAZ31100ML	DIODE ZENER	
FUSES			
F801	XBA2A00101	FUSE 6.3A 125V	
INTEGRATED CIRCUITS			
IC001	MN101E03GTB3	MPU	
IC002	TVR2AJ165S	EEPROM / CT-20G8G CT-20G8SG	
IC002	TVR2AJ166S	EEPROM / CT-20L8G CT-25L8G CT-25L8UG	
IC003	GP1UE282GK	IR SENSOR	
IC004	PST9128NR	RESET	
IC005	PQ3RD13	3.3V STBY REGULATOR	
IC451	AN5522	VERTICAL OUT AMP	
IC501	NC7SZU04M5X	H-DRIVE INVERTER	
IC551	AN78M09LB	9V VOLTAGE REGULATOR	
IC552	AN78M05LB	5V VOLTAGE REGULATOR	
IC801	STRW5634	MAIN POWER SUPPLY	
IC802	0N3171RLF	OPTO-COUPLER	
IC2201	AN5829S-E1V	MTS	
IC2301	AN17807A	AUDIO AMP	
IC3001	MM1114XFBE	VIDEO SWITCH	
COILS			
L002	EXCELSA39V	FERRITE BEAD	
L003	EXCELD35V	FERRITE BEAD	
L005	EXCELSA35V	FERRITE BEAD	
L006	EXCELSA35T	FERRITE BEAD	
L007	ELESN330JA	COIL PEAKING 33UH	
L008	G0C470KA0029	COIL PEAKING 47UH	
L010	G0C2R2KA0029	COIL PEAKING 2.2UH	
L011	EXCELSA26T	FERRITE BEAD	
L012	G0C2R2KA0029	COIL PEAKING 2.2UH	
L013	EXCELSA26T	FERRITE BEAD	
L014	ELESN180KA	COIL PEAKING 18UH	
L015	ELESN3R3JA	COIL PEAKING 3.3UH	
L020	EXCELSA26T	FERRITE BEAD	
L023	EXCELSA26T	FERRITE BEAD / CT-25L8G CT-25L8UG	
L032	EXCELSA26T	FERRITE BEAD	
L108	EXCELSA35V	FERRITE BEAD	
L110	G0C101KA0021	COIL PEAKING 100UH	
L245	EXCELSA35V	FERRITE BEAD	
L312	EXCELSA24T	FERRITE BEAD	
L351	G0C101KA0021	COIL PEAKING 100UH / CT-25L8G CT-25L8UG	
L551	ELH5L4101	COIL / CT-20G8G CT-20G8SG CT-20L8G	
L551	ELH5L6128	COIL HORIZ. LINEARITY / CT-25L8G CT-25L8UG	
L552	EXCELSA39V	FERRITE BEAD	
L801	ELF15N011A	COIL / CT-20G8G CT-20G8SG CT-20L8G	
L801	ELF21V018A	COIL / CT-25L8G CT-25L8UG	
L802	ELEIN680KA	COIL PEAKING 68UH / CT-20G8G CT-20G8SG CT-20L8G	
L802	TALL08T470KA	COIL / CT-25L8G CT-25L8UG	
L803	TALL08T680KA	COIL	
L804	EXCELD35V	FERRITE BEAD / CT-20G8G CT-20G8SG CT-20L8G	
L805	EXCELD35V	FERRITE BEAD / CT-20G8G CT-20G8SG CT-20L8G	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	12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Ref. No.	Part No.	Part Name & Description	Remarks
L806	EXCELD35V	FERRITE BEAD	
L807	EXCELSA35V	FERRITE BEAD	
L808	EXCELSA35V	FERRITE BEAD	
L809	EXCELD35V	FERRITE BEAD / CT-25L8G CT-25L8UG	
L810	EXCELD35V	FERRITE BEAD / CT-25L8G CT-25L8UG	
L2301	EXCELD35V	FERRITE BEAD / CT-20L8G CT-25L8G CT-25L8UG	
L2303	EXCELSA39T	FERRITE BEAD / CT-25L8G CT-25L8UG	
L2305	EXCELSA35V	FERRITE BEAD	
TRANSISTORS			
Q001	2SD601ARTX	TRANSISTOR	
Q057	2SB709ARTX	TRANSISTOR	
Q058	2SB709ARTX	TRANSISTOR	
Q070	2SD601ARTX	TRANSISTOR	
Q092	2SB709ARTX	TRANSISTOR	
Q351	2SC3063RL	TRANSISTOR	
Q352	2SC3063RL	TRANSISTOR	
Q353	2SC3063RL	TRANSISTOR	
Q354	2SD601ARTX	TRANSISTOR	
Q355	2SD601ARTX	TRANSISTOR	
Q356	2SD601ARTX	TRANSISTOR	
Q357	2SD601ARTX	TRANSISTOR	
Q358	2SD601ARTX	TRANSISTOR	
Q359	2SD601ARTX	TRANSISTOR	
Q360	2SB709ARTX	TRANSISTOR	
Q361	2SB709ARTX	TRANSISTOR	
Q362	2SB709ARTX	TRANSISTOR	
Q411	2SB0710AQL	TRANSISTOR	
Q412	2SD0602AQL	TRANSISTOR	
Q451	2SB709ARTX	TRANSISTOR	
Q501	2SC1573AH	TRANSISTOR	
Q501	2SC4212HLB	TRANSISTOR / CT-25L8G CT-25L8UG	
Q551	2SC562200VLK	TRANSISTOR / CT-20G8G CT-20G8SG CT-20L8G	
Q551	2SC5902000LK	TRANSISTOR / CT-25L8G CT-25L8UG	
Q560	2SB709ARTX	TRANSISTOR	
Q605	2SB709ARTX	TRANSISTOR	
Q606	2SD601ARTX	TRANSISTOR	
Q801	2SD601ARTX	TRANSISTOR	
Q802	2SD601ARTX	TRANSISTOR	
Q820	2SA1767QTA	TRANSISTOR	
Q830	2SB1011QRL	TRANSISTOR	
Q831	2SC1473ATA	TRANSISTOR	
Q2350	2SB709ARTX	TRANSISTOR	
Q3001	2SD601ARTX	TRANSISTOR	
Q3002	2SD601ARTX	TRANSISTOR	
RELAYS			
RL801	K6B1AGA00042	RELAY	
RESISTORS			
J327	ERDS2TJ471T	RES C 470-J-1/2W	
R001	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R004	ERJ6GEYJ562V	RES M 5.6K-J-1/10W	
R005	ERJ6GEYJ471V	RES M 470-J-1/10W	
R007	ERJ6GEYJ471V	RES M 470-J-1/10W	
R008	ERJ6GEYJ223V	RES M 22K-J-1/10W	

Ref. No.	Part No.	Part Name & Description	Remarks
R009	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R014	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R015	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R016	ERJ6GEYJ221V	RES M 220-J-1/10W	
R017	ERJ6GEYJ221V	RES M 220-J-1/10W	
R018	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R019	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R020	ERJ6GEYJ221V	RES M 220-J-1/10W	
R021	ERJ6GEYJ101V	RES M 100-J-1/10W	
R022	ERJ6GEYJ101V	RES M 100-J-1/10W	
R023	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R024	ERJ6GEYJ101V	RES M 100-J-1/10W	
R025	ERJ6GEYJ101V	RES M 100-J-1/10W	
R026	ERDS1FJ561P	RES C 560-J-1/2W	
R032	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R033	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R034	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R035	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R036	ERJ6GEYJ512V	RES M 5.1K-J-1/10W	
R037	ERJ6GEYJ912V	RES M 9.1K-J-1/10W	
R038	ERJ6GEYJ223V	RES M 22K-J-1/10W	
R039	ERDS2TJ102T	RES C 1K-J-1/4W	
R040	ERJ6GEYJ680V	RES M 68-J-1/10W	
R041	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R042	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R043	ERJ6GEYJ153V	RES M 15K-J-1/10W	
R044	ERJ6GEYJ101V	RES M 100-J-1/10W	
R045	ERDS2TJ101T	RES C 100-J-1/4W	
R046	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R047	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R048	ERJ6GEYJ101V	RES M 100-J-1/10W	
R050	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R052	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R053	ERJ6GEYJ101V	RES M 100-J-1/10W	
R055	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R056	ERJ6GEYJ471V	RES M 470-J-1/10W	
R057	ERJ6GEYJ101V	RES M 100-J-1/10W	
R060	ERJ6GEYJ101V	RES M 100-J-1/10W	
R061	ERJ6GEYJ221V	RES M 220-J-1/10W	
R062	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R063	ERDS2TJ101T	RES C 100-J-1/4W	
R064	ERJ6GEYJ473V	RES M 47K-J-1/10W	
R065	ERDS2TJ101T	RES C 100-J-1/4W	
R066	ERJ6GEYJ223V	RES M 22K-J-1/10W	
R067	ERJ6GEYJ223V	RES M 22K-J-1/10W	
R068	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R069	ERJ6GEYJ123V	RES M 12K-J-1/10W	
R070	ERJ6GEYJ561V	RES M 560-J-1/10W	
R071	ERJ6GEYJ680V	RES M 68-J-1/10W	
R072	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R073	ERJ6GEYJ471V	RES M 470-J-1/10W	
R074	ERJ6GEYJ471V	RES M 470-J-1/10W	
R075	ERJ6ENF3902V	RES M 39K-F-1/10W	
R076	ERJ6ENF6201V	RES M 6.2K-F-1/10W	

Ref. No.	Part No.	Part Name & Description	Remarks
R077	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R078	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R080	ERJ6GEYJ183V	RES M 18K-J-1/10W	
R081	ERJ6GEYJ153	RES M 15K-J-1/10	
R082	ERJ6GEYJ183V	RES M 18K-J-1/10W	
R083	ERJ6GEYJ153V	RES M 15K-J-1/10W	
R084	ERDS2TJ182T	RES C 1.8K-J-1/4W	
R087	ERDS2TJ221T	RES C 220-J-1/4W	
R088	ERJ6GEYJ223V	RES M 22K-J-1/10W	
R092	ERJ6GEYJ473V	RES M 47K-J-1/10W	
R093	ERJ6GEYJ331V	RES M 330-J-1/10W	
R351	ERG2FJ123H	RES M 12K-J-2W	
R352	ERG2FJ123H	RES M 12K-J-2W	
R353	ERG2FJ123H	RES M 12K-J-2W	
R354	ERC12GK272C	RES C 2.7K-K-1/2W	
R355	ERC12GK272C	RES C 2.7K-K-1/2W	
R356	ERC12GK272C	RES C 2.7K-K-1/2W	
R357	ERJ6ENF3300V	RES M 330-F-1/10W	
R358	ERJ6ENF3300V	RES M 330-F-1/10W	
R359	ERJ6ENF3300V	RES M 330-F-1/10W	
R360	ERJ6ENF1101V	RES M 1.1K-F-1/10W / CT-20G8G CT-20G8SG CT-20L8G	
R360	ERJ6ENF9100V	RES M 910-F-1/10W / CT-25L8G CT-25L8UG	
R361	ERJ6ENF1101V	RES M 1.1K-F-1/10W / CT-20G8G CT-20G8SG CT-20L8G	
R361	ERJ6ENF9100V	RES M 910-F-1/10W / CT-25L8G CT-25L8UG	
R362	ERJ6ENF1101V	RES M 1.1K-F-1/10W / CT-20G8G CT-20G8SG CT-20L8G	
R362	ERJ6ENF9100V	RES M 910-F-1/10W / CT-25L8G CT-25L8UG	
R363	ERJ6GEYJ101V	RES M 100-J-1/10W	
R364	ERJ6GEYJ101V	RES M 100-J-1/10W	
R365	ERJ6GEYJ101V	RES M 100-J-1/10W	
R369	ERDS2TJ393T	RES C 39K-J-1/4W / CT-25L8G CT-25L8UG	
R370	ERDS2TJ224T	RES C 220K-J-1/4W / CT-25L8G CT-25L8UG	
R371	ERJ6GEYJ101V	RES M 100-J-1/10W	
R372	ERJ6GEYJ101V	RES M 100-J-1/10W	
R373	ERJ6GEYJ101V	RES M 100-J-1/10W	
R374	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R375	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R376	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R377	ERJ6ENF3300V	RES M 330-F-1/10W	
R378	ERJ6ENF3300V	RES M 330-F-1/10W	
R379	ERJ6ENF3300V	RES M 330-F-1/10W	
R380	ERJ6ENF1501V	RES M 1.5K-F-1/10W	
R381	ERJ6ENF1501V	RES M 1.5K-F-1/10W	
R382	ERJ6ENF1501V	RES M 1.5K-F-1/10W	
R383	ERJ6ENF3481V	RES M 3.48K-F-1/10W	
R384	ERJ6ENF7500V	RES M 750-F-1/10W	
R385	ERDS1FJ150P	RES C 15-J-1/2W	
R389	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R390	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R391	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R411	ERJ6GEYJ682V	RES M 6.8K-J-1/10W	
R412	ERJ6GEYJ471V	RES M 470-J-1/10W	
R413	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R414	ERJ6GEYJ471V	RES M 470-J-1/10W	
R451	ERDS1FJ1R0P	RES C 1.0-J-1/2W / CT-25L8G CT-25L8UG	

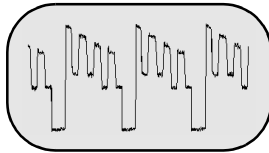
Ref. No.	Part No.	Part Name & Description	Remarks
R451	ERDS1FJ1R2P	RES C 1.2-J-1/2W / CT-20G8G CT-20G8SG CT-20L8G	
R453	ERJ6GEYJ333V	RES M 33K-J-1/10W	
R454	ERJ6GEYJ243V	RES M 24K-J-1/10W / CT-20G8G CT-20G8SG CT-20L8G	
R454	ERJ6GEYJ363V	RES M 36K-J-1/10W / CT-25L8G CT-25L8UG	
R455	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R456	ERG3FJ151	RES M 150-J-3W	
R457	ERDS1FJ1R0P	RES C 1.0-J-1/2W	
R458	ERJ6GEYJ123V	RES M 12K-J-1/10W	
R459	ERJ6GEYJ122V	RES M 1.2K-J-1/10W / CT-20G8G CT-20G8SG CT-20L8G	
R459	ERJ6GEYJ152V	RES M 1.5K-J-1/10W / CT-25L8G CT-25L8UG	
R462	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R463	ERJ6GEYJ473V	RES M 47K-J-1/10W	
R464	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R468	ERJ6ENF1962V	RES M 19.6K-F-1/10W	
R469	ERJ6ENF5621V	RES M 5.62K-F-1/10W	
R471	ERJ6GEYJ223V	RES M 22K-J-1/10W / CT-25L8G CT-25L8UG	
R471	ERJ6GEYJ333V	RES M 33K-J-1/10W / CT-20G8G CT-20G8SG CT-20L8G	
R504	ERDS2TJ102T	RES C 1K-J-1/4W	
R505	ERJ6GEYJ562V	RES M 5.6K-J-1/10W	
R506	ERG1SJ562P	RES M 5.6K-J-1W	
R507	ER0S2THF1802	RES M 18K-F-1/4W	
R509	ERJ6ENF1002V	RES M 10K-F-1/10W	
R510	ERG3FJ472	RES M 4.7K-J-3W / CT-20G8G CT-20G8SG CT-20L8G	
R510	ERG3FJ622	RES M 6.2K-J-3W / CT-25L8G CT-25L8UG	
R511	ERG3FJ622	RES M 6.2K-J-3W / CT-25L8G CT-25L8UG	
R512	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R514	ERJ6GEYJ392V	RES M 3.9K-J-1/10W	
R515	ERDS2TJ101T	RES C 100-J-1/4W	
R532	ERJ6ENF2202V	RES M 22K-F-1/10W	
R533	ERJ6ENF1003V	RES M 100K-F-1/10W	
R540	ERJ6GEYJ105V	RES M 1M-J-1/10W	
R541	ERDS2TJ274T	RES C 27K-J-1/4W	
R542	ERJ6GEYJ124V	RES M 120K-J-1/10W	
R551	ERX12SJR47P	RES M .47-J-1/2W	
R552	ERDS1FJ1R0T	RES C 1.0-J-1/2W	
R557	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R558	ERQ1CKPR56S	RES F .56-K-1W / CT-25L8G CT-25L8UG	
R558	ERQ2CJP1R5S	RES F 1.5-J-2W / CT-20G8G CT-20G8SG CT-20L8G	
R559	ERG2FJ683H	RES M 12K-J-2W	
R561	ERG2FJ102H	RES M 1K-J-2W	
R562	ERG2FJ270H	RES M 27-J-2W	
R563	ERG3FJ150H	RES M 15-J-3W	
R564	ERDS2TJ104T	RES C 100K-J-1/4W	
R565	ERDS2TJ393T	RES C 39K-J-1/4W / CT-25L8G CT-25L8UG	
R565	ER0S2TKF9762	RES M 97.6K-F-1/4W / CT-20G8G CT-20G8SG CT-20L8G	
R592	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R605	ERDS2TJ103T	RES C 10K-J-1/4W	
R606	ERJ6GEYJ562V	RES M 5.6K-J-1/10W	
R607	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R608	ERJ6GEYJ104V	RES M 100K-J-1/10W	

Ref. No.	Part No.	Part Name & Description	Remarks
R801	ERF7ZK1R5	RES W 1.5-K-7 / CT-25L8G CT-25L8UG	
R802	ERG2FJ104H	RES M 100K-J-2W	
R804	ERG1DJ224P	RES M220K-J-1W	
R805	ERX2FZJR15H	RES M .18-J-2W	
R806	ERX12SJ1R5P	RES M 1.5-J-1/2W	
R807	ERDS2TJ681T	RES C 680-J-1/4W	
R808	ERX12SJ1R5P	RES M 1.5-J-1/2W	
R809	ERDS2TJ472T	RES C 4.7K-J-1/4	
R810	ERDS2TJ221T	RES C 220-J-1/4W	
R815	ERC12ZGK825D	RES C 8.2MEG-K-1/2W	
R817	ERX3FJ6R8	RES M 6.8-J-3W / CT-20G8G CT-20G8SG CT-20L8G	
R821	ERDS1FJ1R0T	RES C 1.0-J-1/2W / CT-25L8G CT-25L8UG	
R821	ERDS1FJ1R5T	RES C 1.5-J-1/2W / CT-20G8G CT-20G8SG CT-20L8G	
R822	ERDS1FJ1R0T	RES C 1.0-J-1/2W / CT-25L8G CT-25L8UG	
R822	ERDS1FJ1R5T	RES C 1.5-J-1/2W / CT-20G8G CT-20G8SG CT-20L8G	
R823	ERDS1FJ272T	RES C 2.7K-J-1/2W	
R824	ERDS2TJ223T	RES C 22K-J-1/4W	
R825	ERDS2TJ272T	RES C 2.7K-J-1/4W	
R827	ERJ6GEYJ153V	RES M 15K-J-1/10W	
R828	ERJ6GEYJ104V	RES M 100K-J-1/10W	
R829	ERJ6GEYJ104V	RES M 100K-J-1/10W	
R830	ERG2FJ273H	RES M 27K-J-2W	
R831	ERDS2TJ682T	RES C 6.8K-J-1/4W	
R832	ERJ6GEYJ122V	RES M 1.2K-J-1/10W / CT-25L8G CT-25L8UG	
R832	ERJ6GEYJ512V	RES M 5.1K-J-1/10W / CT-20G8G CT-20G8SG CT-20L8G	
R833	ERJ6GEYJ473V	RES M 47K-J-1/10W	
R834	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R837	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R838	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R850	ERQ12HJR22P	RES F .22-J-1/2W / CT-25L8G CT-25L8UG	
R850	ERQ12HJR56P	RES F .56-J-1/2W / CT-20G8G CT-20G8SG CT-20L8G	
R202	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R2201	ERJ6GEYJ224V	RES M 220K-J-1/10W	
R2203	ERJ6GEYJ272V	RES M 2.7K-J-1/10W	
R2204	ERJ6GEYJ272V	RES M 2.7K-J-1/10W	
R2205	ERDS2TJ101T	RES C 100-J-1/4W	
R2206	ERDS2TJ273T	RES C 27K-J-1/4W	
R2207	ERJ6GEYJ152V	RES M 1.5K-J-1/10W	
R2208	ERJ6GEYJ152V	RES M 1.5K-J-1/10W	
R2301	ERQ2CJP5R6S	RES F 5.6-J-2W / CT-20G8G CT-20G8SG CT-20L8G	
R2351	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2352	ERJ6GEYJ152V	RES M 1.5K-J-1/10W	
R2357	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R2370	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R3002	ERJ6GEYJ221V	RES M 220-J-1/10W	
R3003	ERJ6GEYJ221V	RES M 220-J-1/10W	
R3004	ERDS2TJ101T	RES C 100-J-1/4W	
R3005	ERJ6GEYJ334V	RES M 330K-J-1/10W	
R3006	ERJ6GEYJ151V	RES M 150-J-1/10W	
R3007	ERJ6GEYJ151V	RES M 150-J-1/10W	
R3008	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3009	ERJ6GEYJ682V	RES M 6.8K-J-1/10W	

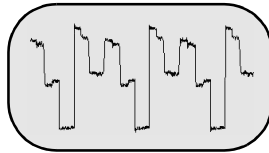
Ref. No.	Part No.	Part Name & Description	Remarks
R3010	ERJ6GEYJ334V	RES M 330K-J-1/10W	
R3011	ERJ6GEYJ682V	RES M 6.8K-J-1/10W	
R3012	ERDS2TJ101T	RES C 100-J-1/4W	
R3013	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3014	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3015	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3016	ERDS2TJ181T	RES C 180-J-1/4W	
R3017	ERDS2TJ181T	RES C 180-J-1/4W	
R3018	ERDS2TJ101T	RES C 100-J-1/4W	
R3019	ERJ6GEYJ682V	RES M 6.8K-J-1/10W	
R3020	ERJ6GEYJ682V	RES M 6.8K-J-1/10W	
R3021	ERDS2TJ101T	RES C 100-J-1/4W	
R3022	ERDS2TJ101T	RES C 100-J-1/4W	
R3023	ERDS2TJ101T	RES C 100-J-1/4W	
R3024	ERDS2TJ101T	RES C 100-J-1/4W	
R3026	ERDS2TJ101T	RES C 100-J-1/4W	
R3027	ERDS2TJ101T	RES C 100-J-1/4W	
R3034	ERJ6GEYJ471V	RES M 470-J-1/10W	
R3035	ERJ6GEYJ562V	RES M 5.6K-J-1/10W	
R3036	ERJ6GEYJ183V	RES M 18K-J-1/10W	
R3037	ERJ6GEYJ471V	RES M 470-J-1/10W	
R3038	ERJ6GEYJ562V	RES M 5.6K-J-1/10W	
R3039	ERJ6GEYJ183V	RES M 18K-J-1/10W	
R3041	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R3042	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R3101	ERJ6GEYJ334V	RES M 330K-J-1/10W	
R3102	ERJ6GEYJ334V	RES M 330K-J-1/10W	
R3103	ERJ6GEYJ334V	RES M 330K-J-1/10W	
R3104	ERJ6GEYJ334V	RES M 330K-J-1/10W	
SWITCHES			
S001	EVQPF106K	SWITCH	
S002	EVQPF106K	SWITCH	
S003	EVQPF106K	SWITCH	
S004	EVQPF106K	SWITCH	
S005	EVQPF106K	SWITCH	
S008	EVQPF106K	SWITCH	
S009	EVQPF106K	SWITCH	
TRANSFORMERS			
T501	ETH19Y211AZ	TRASMFORMER	
T551	TLF2AA004	TRANSFORMER FLYBACK / CT-25L8G CT-25L8UG	
T551	ZTFN32501A	TRANSFORMER FLYBACK / CT-20G8G CT-20G8SG CT-20L8G	
T801	ETS29AS1N5NC	TRANSFORMER / CT-20G8G CT-20G8SG CT-20L8G	
T801	SRW35EC-U07V	TRANSFORMER SWITCHING / CT-25L8G CT-25L8UG	
T3001	TF0402B04P03	TRANSFORMER	
T3002	TF0402B04P03	TRANSFORMER	
CRYSTALS / FILTERS			
X001	A1100005BD	CRYSTAL	
OTHERS			
TNR001	ENG36621G	TUNER	
M001	TSX2AA0361	LINE CORD AC	
M002	TJSC00300	CRT SOCKET	

Ref. No.	Part No.	Part Name & Description	Remarks
<u>1</u>	A51KQK99X01	CRT 20 INCH, DEFLECTION YOKE, PURITY AND CONVERGENCE RINGS / CT-20G8G CT-20G8SG CT-20L8G	⚠
	A63QDB891X	CRT 25 INCH / CT-25L8G CT-25L8UG	⚠
<u>2</u>	TLY2AA027	DEFLECTION YOKE / CT-25L8G CT-25L8UG	⚠
<u>3</u>	JH291U-009	PURITY AND CONVERGENCE RINGS / CT-25L8G CT-25L8UG	
<u>4</u>	TSP2AA008	COIL DEGAUSSING / CT-20G8G CT-20G8SG CT-20L8G	⚠
	TSP2AA028	COIL DEGAUSSING / CT-25L8G CT-25L8UG	⚠
<u>5</u>	TXF3A01BA3	ASSY. DAG GND / CT-20G8G CT-20G8SG CT-20L8G	
	TXF3A01DF3	ASSY. DAG GND / CT-25L8G CT-25L8UG	
M003	TMM2A30702	WEDGE YOKE	
M004	0FMK014ZZ	CONVERGENCE CORRECTOR STRIP	
M005	TSN40007	MAGNET PURITY / CT-25L8G CT-25L8UG	
M006	TSN63115-4	MAGNET PURITY / CT-20G8G CT-20G8SG CT-20L8G	
<u>6</u>	TXFKY13GSER	ASSY CABINET FRONT / CT-20G8G	
	TXFKY14GSER	ASSY CABINET FRONT / CT-20L8G	
	TXFKY15GSER	ASSY CABINET FRONT / CT-20G8SG	
	TXFKY16GSER	ASSY CABINET FRONT / CT-25L8G CT-25L8UG	
<u>7</u>	TXFKU11GSER	ASSY CABINET BACK / CT-20G8G CT-20G8SG CT-20L8G	
	TXFKU12FSER	ASSY CABINET BACK / CT-25L8G CT-25L8UG	
<u>8</u>	TKX2AA00401	IR GUIDE / CT-20G8G CT-20G8SG CT-20L8G	
	TKX2AA00403	IR GUIDE / CT-25L8G CT-25L8UG	
<u>9</u>	TAS2AA0012	SPEAKER 16-OHM 1.5W	
<u>10</u>	TBM2A10141	BADGE PANASONIC / CT-20G8G	
	TBM2A10143	BADGE PANASONIC / CT-20G8SG CT-20L8G CT-25L8G CT-25L8UG	
<u>11</u>	TBX2AA1303G	BUTTON 7-KEY / CT-25L8G CT-25L8UG	
	TBX2AA1701GS	BUTTON 7-KEY / CT-20G8G	
	TBX2AA1702G	BUTTON 7-KEY / CT-20L8G	
	TBX2AA1702GS	BUTTON 7-KEY / CT-20G8SG	
JK3001	TJB2AA0221	TERMINAL A/V 8P / CT-20L8G CT-25L8G CT-25L8UG	
JK3001	TJB2A9064B	ASSY. JACK A/V / CT-20G8G CT-20G8SG	
JK3002	TJB2AA0046	TERMINAL FRONT A/V	
JK3003	TJB2AA0171	TERMINAL S-VIDEO / CT-20G8G CT-20G8SG	
OTHER ACCESSORIES			
M007	TQB2AA0452-1	OWNERS MANUAL / CT-20G8G CT-20G8SG CT-20L8G	
M008	TQB2AA0461	OWNERS MANUAL / CT-25L8G CT-25L8UG	
M009	EUR7713010	REMOTE CONTROL	
M010	UR77EC1303A	BATTERY COVER REMOTE CONTROL	

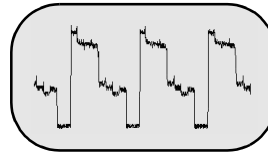
A-Board



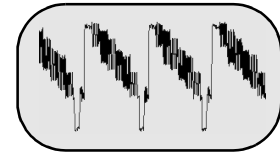
① 4 Vp-p
A11 PIN 3 (BLUE OUT)



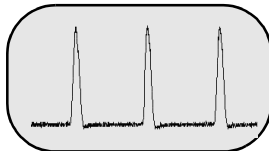
② 4 Vp-p
A11 PIN 1 (RED OUT)



③ 4.32 Vp-p
A11 PIN 2 (GREEN OUT)



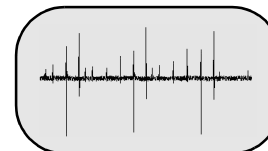
④ 1.3 Vp-p
TPA5 (VIDEO)



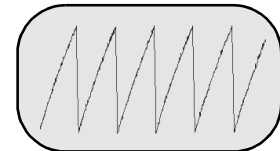
⑤ 3.28 Vp-p
IC001 PIN 36 (FBP IN)



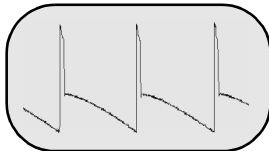
⑥ 10MHz X'tal
IC001 PIN 50 (OSC)



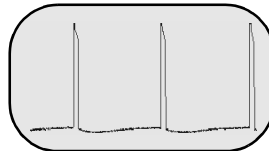
⑦ 600mv Vp-p
IC451 PIN 1 (VERT IN)



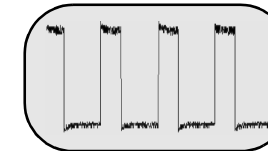
⑧ 3.88 Vp-p
Q4111 B (V DRIVE)



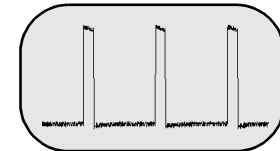
⑨ 56.8 Vp-p
IC451 PIN 5(V OUT)



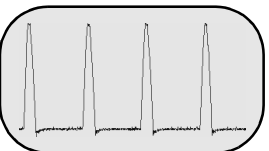
⑩ 28 Vp-p
IC451 PIN 3 (PUMP UP)



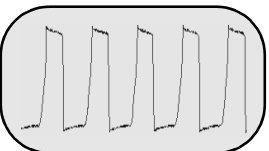
⑪ 3.20 Vp-p
IC501 PIN 4 (H-DRIVE)



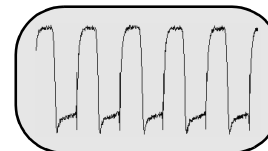
⑫ 114 Vp-p
A12 PIN 2 (HEATER)



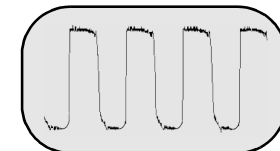
⑬ 1.18 kVp-p
Q551 Collector (H OUT)



⑭ 356 Vp-p
IC801 PIN 1

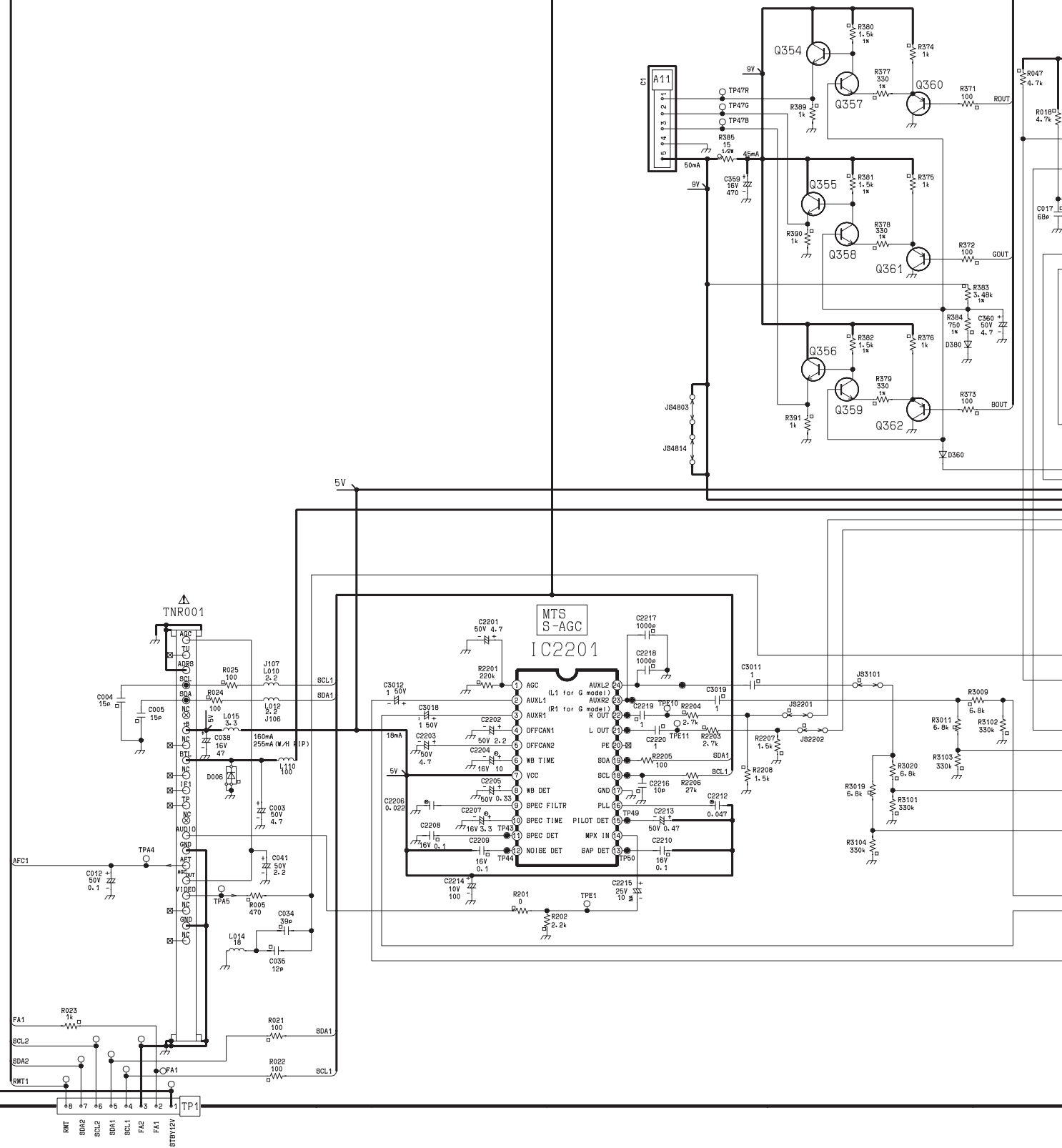


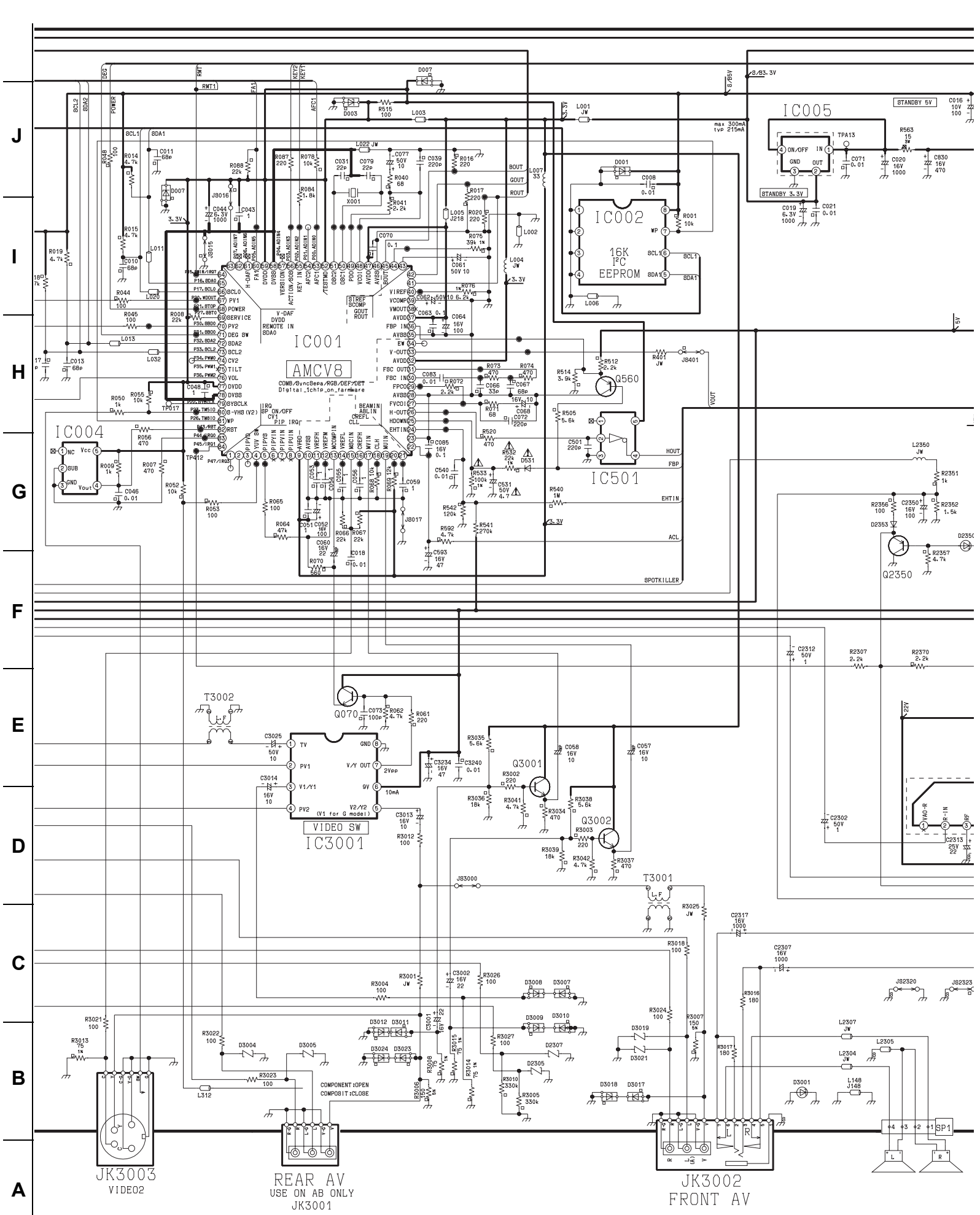
⑮ 2.88 Vp-p
IC801 PIN 7

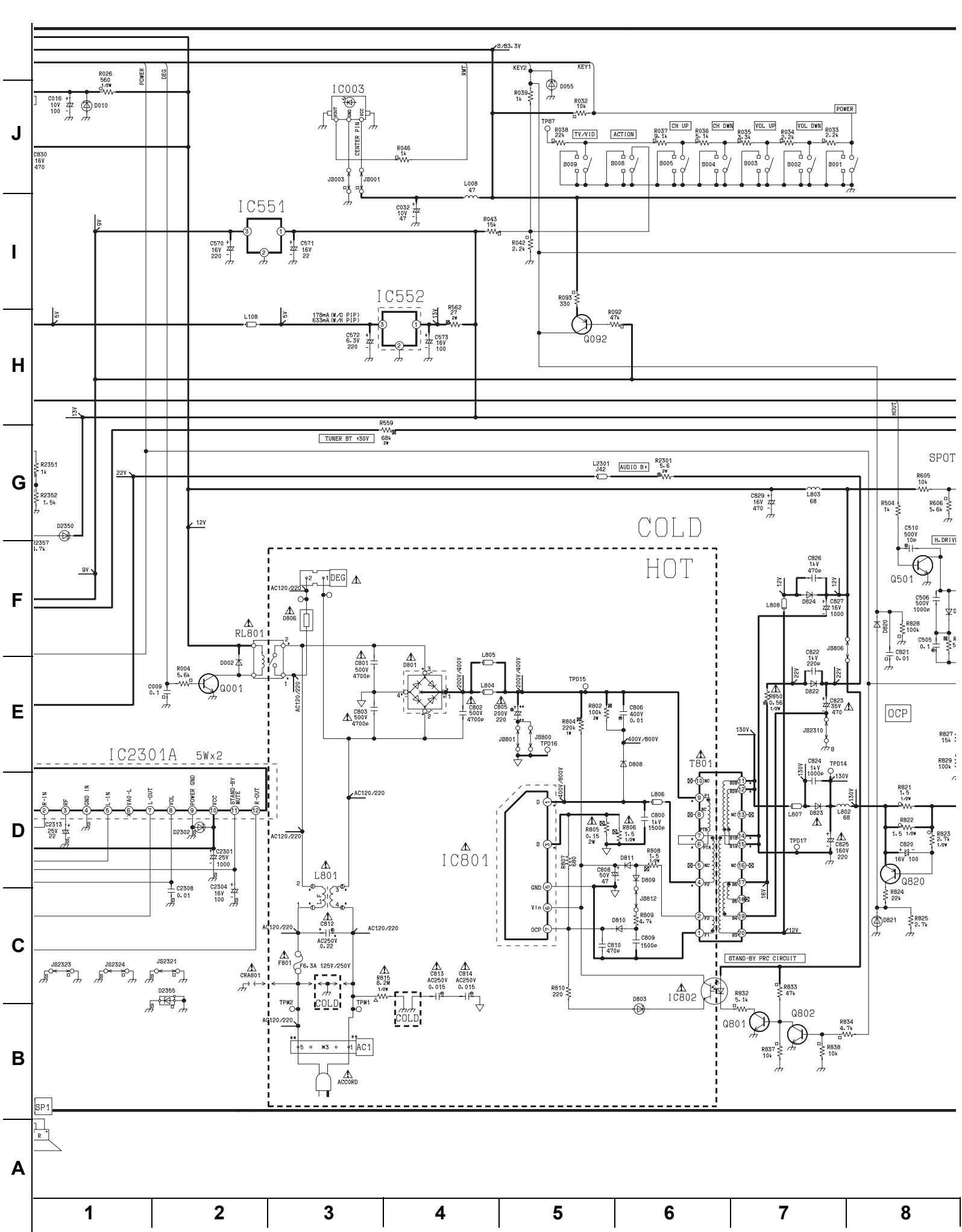


⑯ 114 Vp-p
Q501 Collector

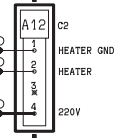
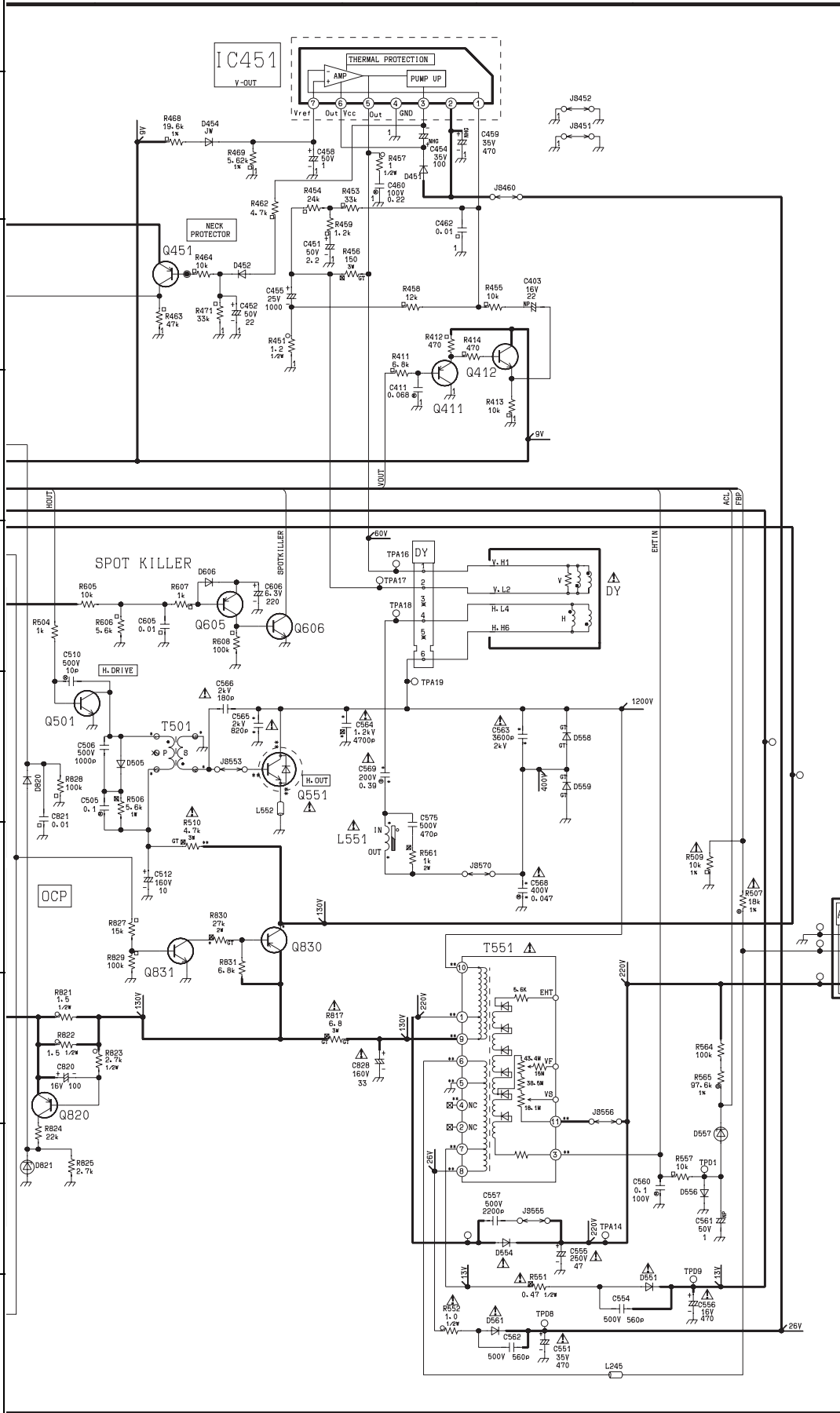
TNP2AH047AA/AB (A)



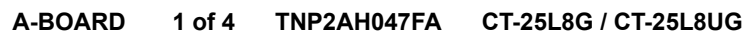


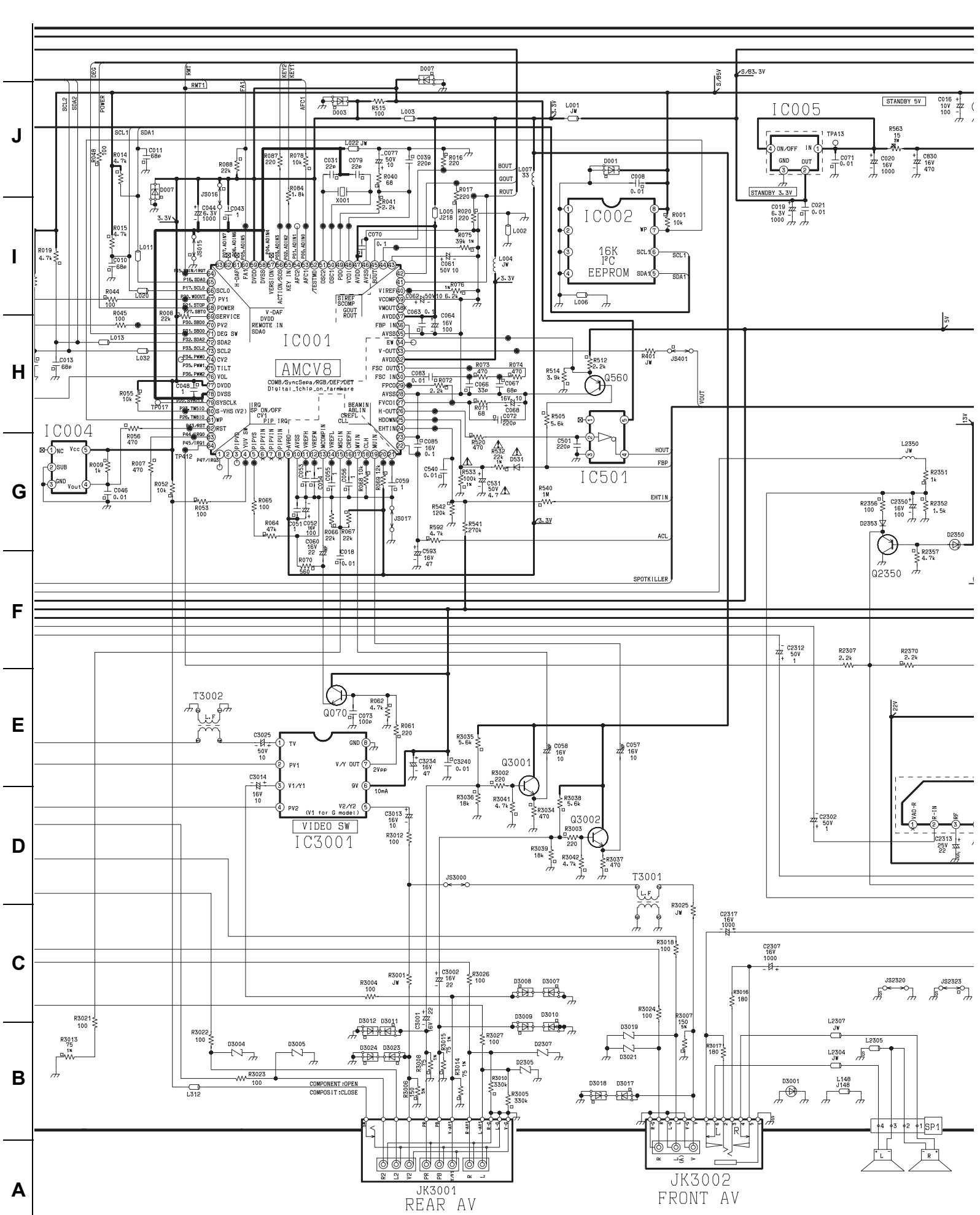


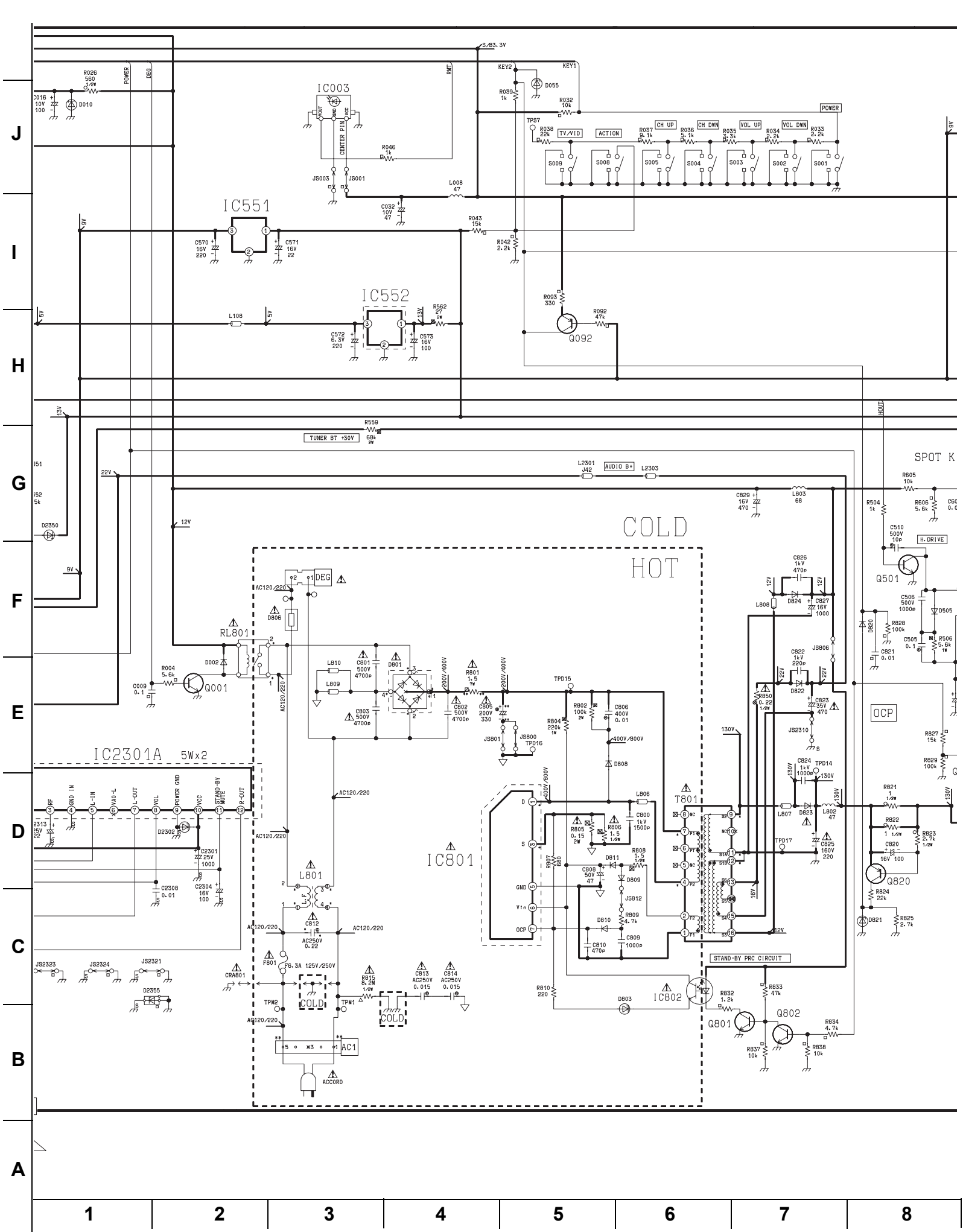
J
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H
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D
C
B
A

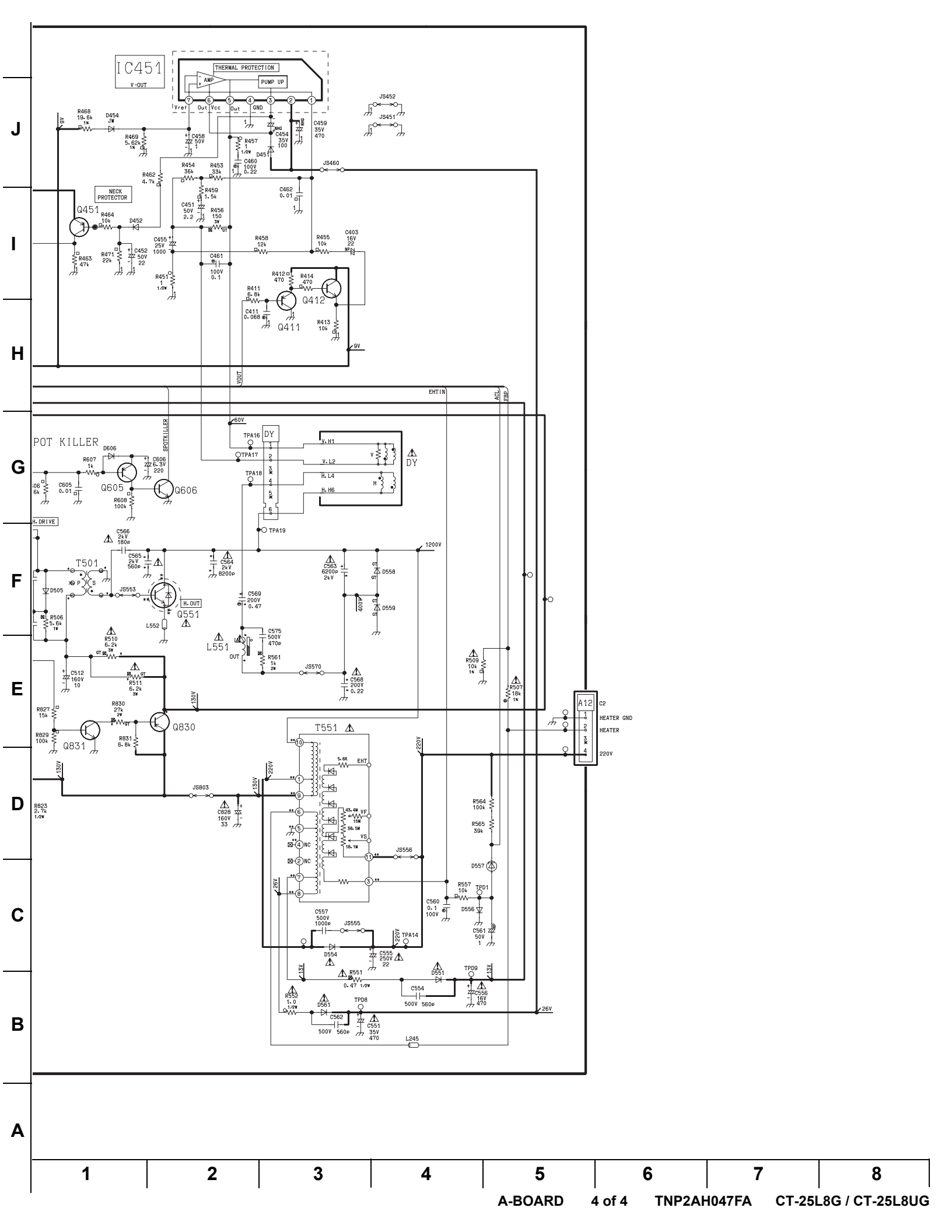


A

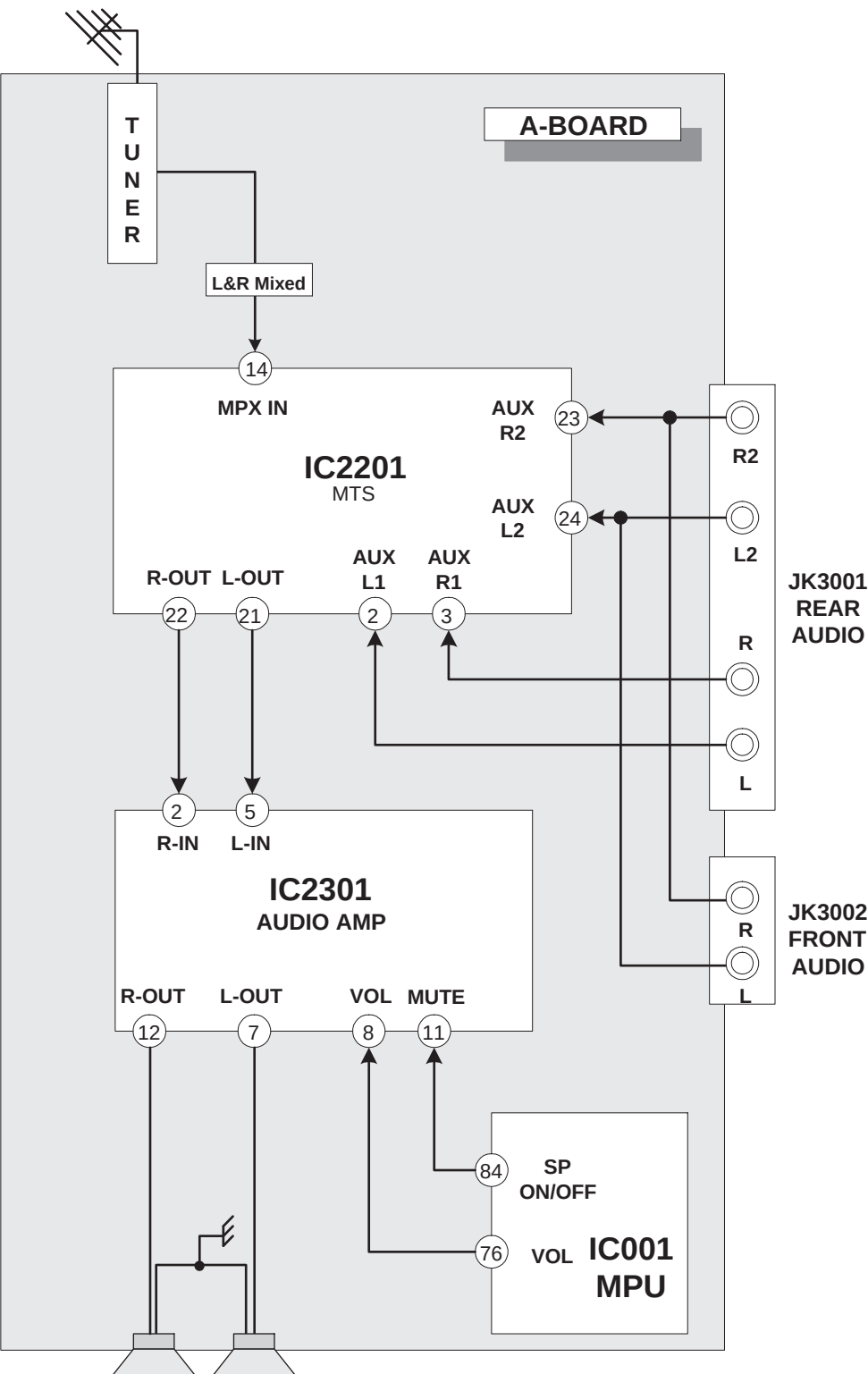




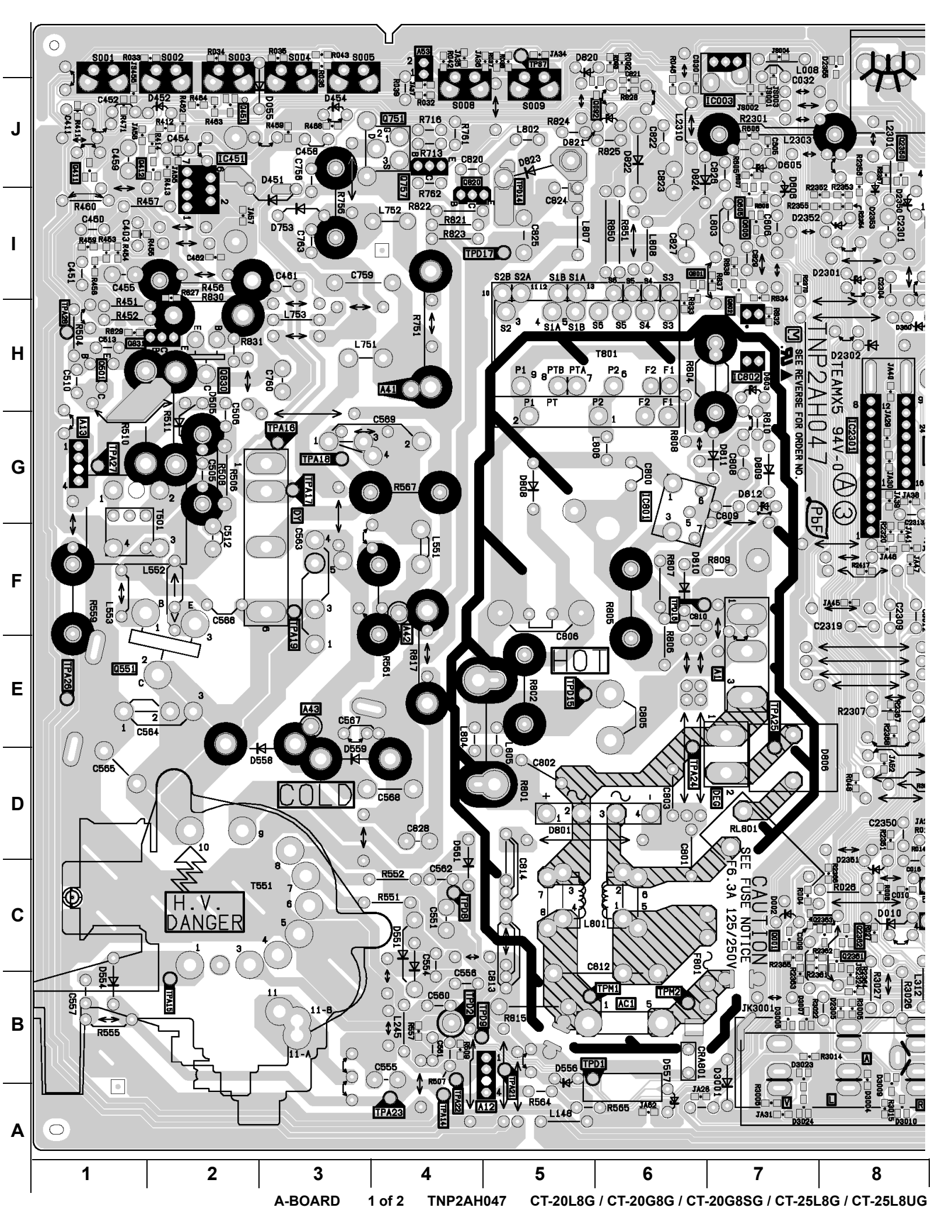




Audio signal path block diagram

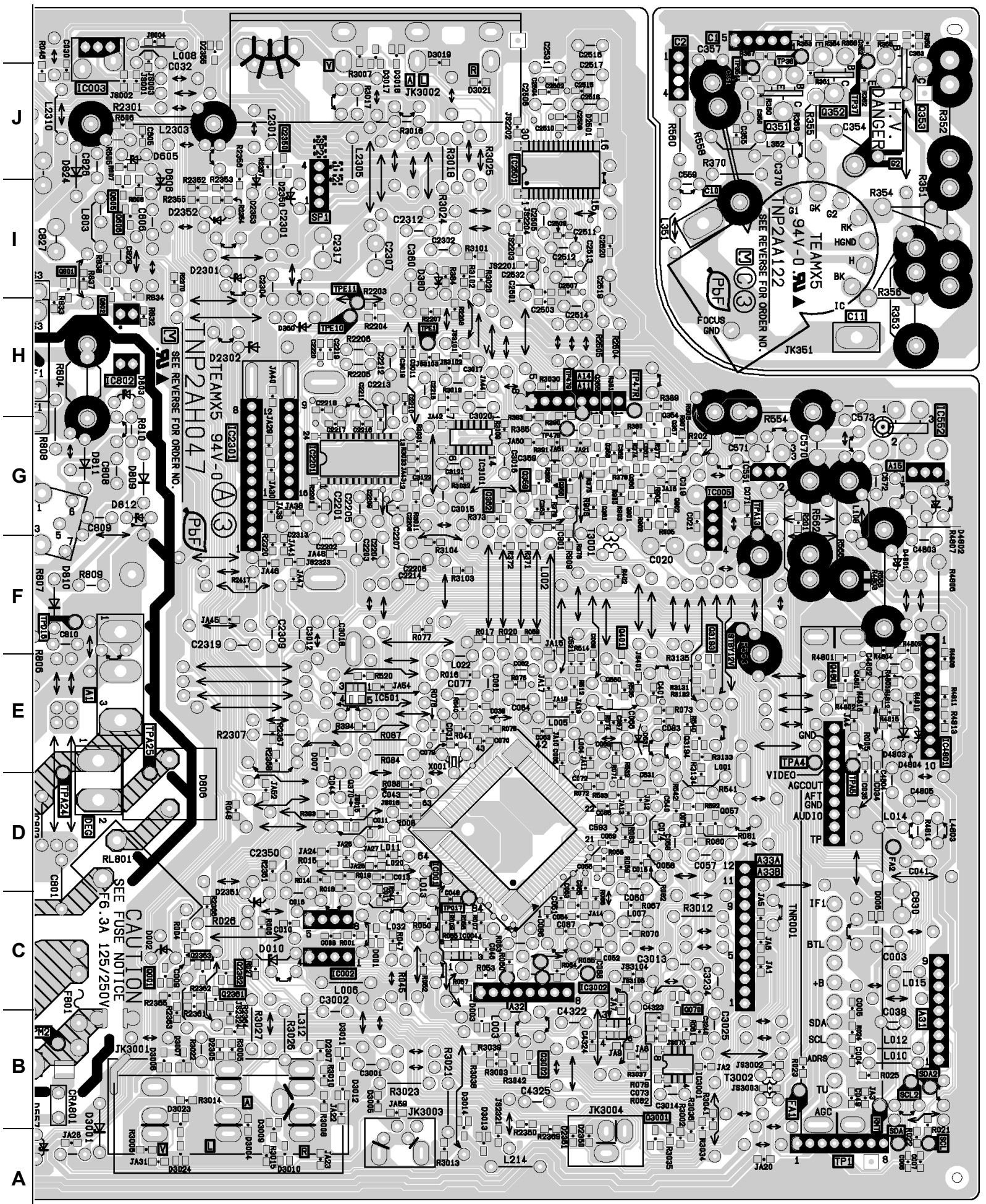




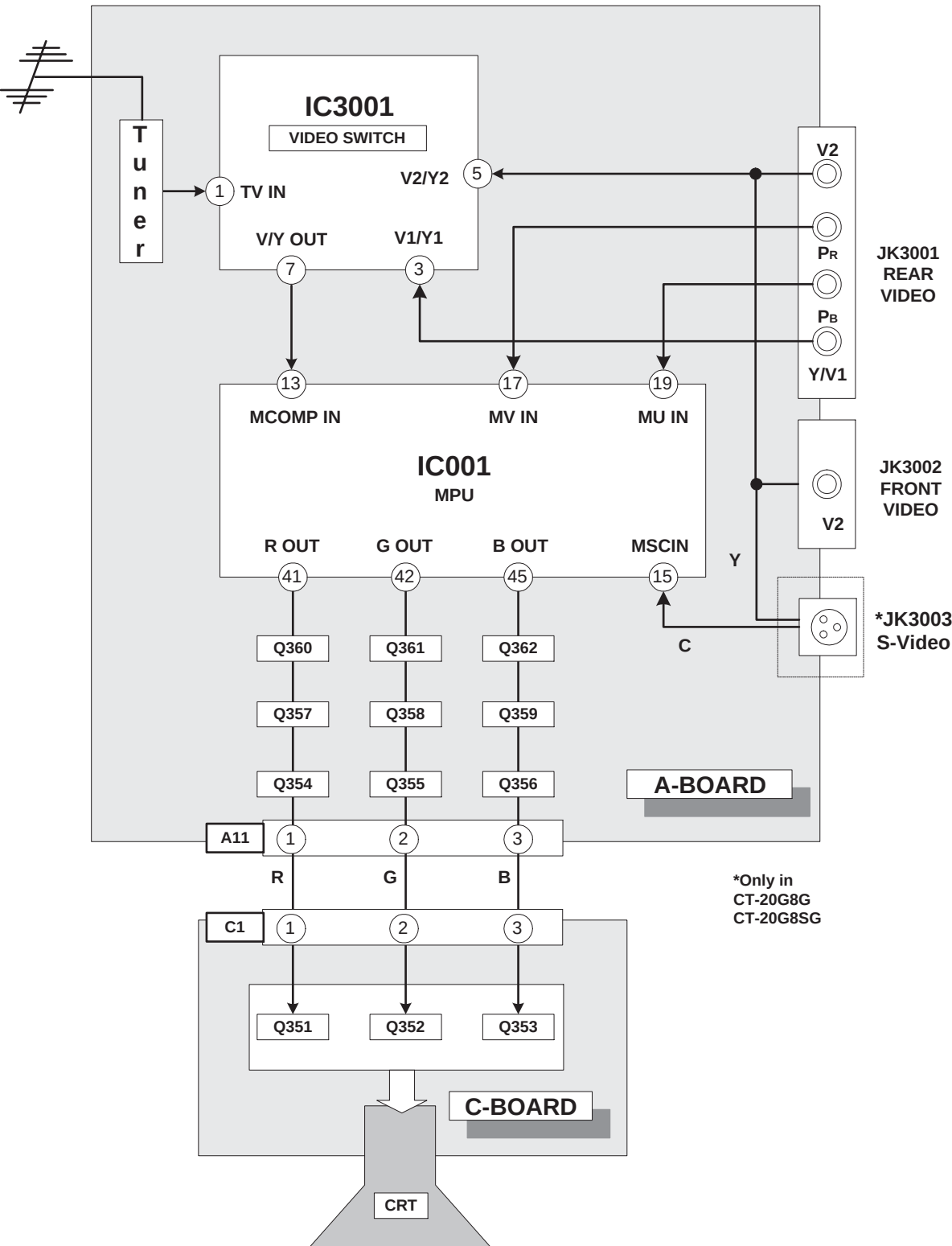


J
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H
G
F
E
D
C
B
A

1 2 3 4 5 6 7 8



Video signal path block diagram



A - BOARD

IC001				
1		0.00	43	2.50
2	....	0.00	44	1.70
3	....	0.00	45	0.00
4	....	0.00	46	0.00
5	....	0.00	47	3.30
6	....	1.20	48	1.90
7	....	1.20	49	1.90
8	....	1.30	50	1.60
9	....	3.30	51	1.70
10	....	0.00	52	3.30
11	....	2.70	53	1.70
12	....	1.50	54	1.40
13	....	1.40	55	3.30
14	....	0.40	56	1.40
15	....	1.60	57	0.00
16	....	2.20	58	0.00
17	....	0.07	59	3.30
18	....	1.70	60	3.30
19	....	0.00	61	3.30
20	....	1.40	62	0.70
21	....	1.00	63	3.30
22	....	2.60	64	3.30
23	....	0.00	65	3.40
24	....	1.90	66	3.50
25	....	1.90	67	0.10
26	....	1.40	68	3.20
27	....	0.00	69	0.00
28	....	0.00	70	0.00
29	....	1.30	71	0.00
30	....	1.80	72	5.20
31	....	1.00	73	5.20
32	....	3.30	74	0.00
33	....	1.70	75	0.00
34	....	0.80	76	0.00
35	....	0.00	77	3.30
36	....	0.60	78	0.00
37	....	3.30	79	0.00
38	....	3.30	80	3.30
39	....	2.30	81	5.20
40	....	1.70	82	3.30
41	....	0.40	83	0.00
42	....	0.40	84	3.30

IC002	
1	0.00
2	0.00
3	0.00
4	0.00
5	3.40
6	3.40
7	5.20
8	5.20

IC003	
1	0.00
2	3.31
3	3.27

IC004	
1	0.00
2	0.00
3	0.00
4	3.30
5	3.30

IC005	
1	9.10
2	3.30
3	0.00
4	9.10

IC451	
1	2.00
2	23.30
3	1.20
4	0.00
5	11.60
6	23.50
7	2.00

IC501	
1	0.00
2	1.35
3	0.00
4	1.05
5	3.30

IC551	
1	12.20
2	0.00
3	9.00

IC552	
1	7.50
2	0.00
3	5.00

IC801↓	
1	-21.00
2	...N/A
3	0.10
4	...N/A
5	0.00
6	32.24
7	1.50

IC802↓	
1	2.30
2	32.24

IC2201			
1	1.60	13	2.80
2	2.20	14	2.20
3	2.20	15	2.50
4	2.30	16	3.50
5	2.40	17	0.00
6	0.07	18	3.20
7	5.00	19	3.40
8	2.50	20	0.00
9	2.60	21	2.20
10	0.80	22	2.20
11	2.30	23	2.20
12	2.50	24	2.20

IC2301	
1	6.40
2	5.60
3	...16.80
4	0.00
5	5.60
6	6.30
7	8.60
8	0.00
9	0.00
10	18.30
11	3.10
12	8.70

IC3001	
1	4.10
2	0.20
3	4.10
4	0.00
5	4.10
6	9.00
7	4.30
8	0.00

A - BOARD

	Q001	Q057	Q058	Q070	Q092	Q2350	Q3001	Q3002	Q354
B	0.00	1.50	1.50	4.12	8.90	5.35	1.30	1.30	4.50
C	13.00	0.00	0.00	8.90	1.40	0.00	3.30	3.30	8.50
E	0.00	0.07	0.07	3.50	3.30	3.14	0.70	0.70	3.80
	Q355	Q356	Q357	Q358	Q359	Q360	Q361	Q362	Q411
B	4.30	4.40	2.60	2.60	2.60	0.50	0.40	0.40	2.25
C	8.40	8.40	4.50	4.30	4.40	0.00	0.00	0.00	0.00
E	3.60	3.70	2.00	2.00	2.00	1.10	1.10	1.10	2.90
	Q412	Q451	Q501	Q551	Q560	Q605	Q606	Q801	Q802
B	2.90	5.10	0.40	0.00	0.30	4.80	0.00	0.00	0.70
C	9.00	1.40	56.80	14.70	0.00	0.00	3.30	12.52	0.00
E	2.40	3.30	0.00	0.00	0.60	4.70	0.00	0.00	0.00
	Q820	Q830	Q831						
B	130.40	129.80	0.60						
C	0.00	130.40	0.20						
E	130.80	130.50	0.00						

C - BOARD

	Q351	Q352	Q353
B	130.40	129.80	0.60
C	0.00	130.40	0.20
E	130.80	130.50	0.00

CT-20L8G / CT-20G8G / CT-20G8SG / CT-25L8G / CT-25L8UG